TRMM SOLAR ARRAY

NASA Contract No.: NAS5-32464

TRW Sales No.:

61058

Customer:

NASA, Goddard Space Flight Center

TRMM SOLAR ARRAY

FINAL REPORT

FEB 2 4 19981

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TRMM SOLAR ARRAY REPORT

CONCLUSIONS/RECOMMENDATIONS:

- agreement with NASA. Lower grade Cells were used on the shadowed Panel (Boom shadow) to maximize available power to the Spacecraft. The average output @ 58.9 volts was 991 watts. The outputs of the four (4) Panels ranged from 960 to 1,022 watts. The Panels successfully passed environmental testing at TRW to the contract specification and subsequent testing at NASA which involved output measurements at elevated Basic requirement of 978.59 watts per Panel output @ 58.9 volts B.O.L. was met on an average basis per
- three (3) design variations with respect to Coverglass-to-Cell and Cell-to-Substrate adhesives. The intent was to qualify multiple designs in case one or more failed. When two of the three combinations failed due to Cells), the TRMM Program was a development effort combined with a Qual and Flight production effort. The most significant technical problem was Cell cracking during Qual thermal cycling. The cracking problem was determined to be generic within our Solar Array factory in the application of GaAs Cells to our designs. As a result, a TRW funded manufacturing process verification panel (known as the <u>M</u>anufacturing <u>V</u>erification Panel) was built to demonstrate our ability to properly apply GaAs Cells. The original Qual Panel comprised excessive Cell breakage during thermal cycling, NASA was reluctant to allow Flight production based on the one remaining good Qual Panel Quadrant. This issue was pivotal for continuing the contract. Facts and As this type of Array had never previously been built by TRW (aluminum Substrate with 4 cm imes 4.4 cm GaAs recommendations are as follows:
- The cause of the excessive cracking was never determined.
- The areas where the excessive cracking occurred utilized DC93-500 glassing adhesive which was NASA approved, and had been widely used by TRW on a multitude of projects.

TRMM SOLAR ARRAY REPORT

CONCLUSIONS/RECOMMENDATIONS (Cont'd.):

- The processes utilized on the original Qual Panel varied for the same operations for schedule expediency and were not well controlled. The Manufacturing Verification Panel passed all requirements except glassing adhesive and CV1-1142 Cell-to-Substrate adhesive). The Panel was constructed utilizing consistent The Manufacturing Verification Panel was built utilizing the successful Qual Panel Quadrant design (CV4-2500 manufacturing processes which were subject to a higher level of control than those used on the original Qual for one cracked Cell. Key lessons learned from this experience are: Panel.
- When multiple designs are to be qualified or "select-in-test" methodology utilized, the Customer and the Contractor must agree on a detail plan with specific pass-fail criteria. A more conservative approach would be to build and test Engineering Model Panels in advance of the Qual Panel or multiple Qual Panels.
- As manufacturing process consistency was an issue with Qual Panel Cell breakage, much attention was levied at duplication of manufacturing processes on the Flight Panels. As "manual" soldering and glassing techniques are required to back-up the automated equipment processing, agreement on use of all processing procedures should be in place prior to Qual or Flight Panel fabrication

TRMM SOLAR ARRAY REPORT

CONCLUSIONS/RECOMMENDATIONS (Cont'd.):

- Reverse Bias Testing: In future contracts, reverse bias requirements should be more definitive.
- during the Cell production at ASEC, a significantly higher price was paid to re-screen existing Cells than the Lack of clarity in the original TRMM specification caused a contract modification to re-screen existing Cells and screen future ASEC production to 1.1 times the short circuit current. As the modification was enacted cost for screening the Cells during the basic production run.
- could not explain the failure mechanism. A waiver was submitted and approved by NASA. In the future, the section (4.10.9) required a dedicated Reverse Bias Test Panel which was tested at -80°C and again at +85°C. The Cells passed the cold cycle but failed (greater than 3% degradation) the hot cycle. ASEC The above referenced modification required screening at ambient temperatures. A separate specification reverse bias requirement for the basic Cells should encompass all other reverse bias considerations. ī

TRMM SOLAR ARRAY

FLIGHT HARDWARE DELIVERABLES:

Qty. Description	1 Ea. +Y Outboard	1 EaY Outboard	1 Ea. –Y Inboard	1 Ea. +Y Inboard	1 Ea. Interconnect, -Y Power	1 Ea. Interconnect, -Y Power	1 Ea. Interconnect, -Y Signal	1 Ea. Interconnect, +Y Power	1 Ea. Interconnect, +Y Power	1 Fa Interconnect. +Y Signal
TRW Drawing No.	828340-1	828340-2	828350-1	828360-1	828383-1	828383-2	828385-1	828387-1	828387-2	828389_1
	Solar Panels				Inter-Panel Harnesses					

PANEL 182 PANEL 384 PANEL 1 & 2 PANEL 3 & 4 Thursday, January 9, 1997 9 10111213141516171819202122232425262728293031323334353637383940 P1&2 P3&4 > PANEL 3 & 4 PANEL 3 & 4 F M A M PANEL 1 & 2 SHADOW TEST INCLUDES F/S DELAM REPAIR PANEL 1 & 2 о N 0 တ **\Q** ⋖ 1995 ¬ Σ ⋖ TRMM SCHEDULE ... STORY SUMMARY Σ ш z o S ⋖ (40 K ELECTRICAL CYCLES) 1994 ے ب Σ ⋖ (17K CYCLES) **∑** ⊔ ۵ z 0 ω JAS 9 CDR Ŋ 4 **\rightarrow** ო **∑** N RWK.& CONFIDENCE TEST PROGRAM GO AHEAD (ATP) QUAL BOARD FABRICATION MVP (REFERENCE ONLY) THERMAL CYCLE TEST ENVIRONMENTAL TEST MODULE FABRICATION MODULE LAY DOWN REVERSE BIAS PANEL **FABRICATION** MECH. FABRICATION INTERCONNECT FLIGHT PANELS SHIP UNITS TEST GLASSING R. BRIG. EXT. 39708 REWORK WIRING ACTIVITY DESIGN

Section 3.0 Waivers and Deviations

 Note: All waivers and deviations were formally approved by NASA

BEQUEST FOR DEMATION/WAIVER

(Coo MH STD 480 or 481 for instructions)

95/06/19

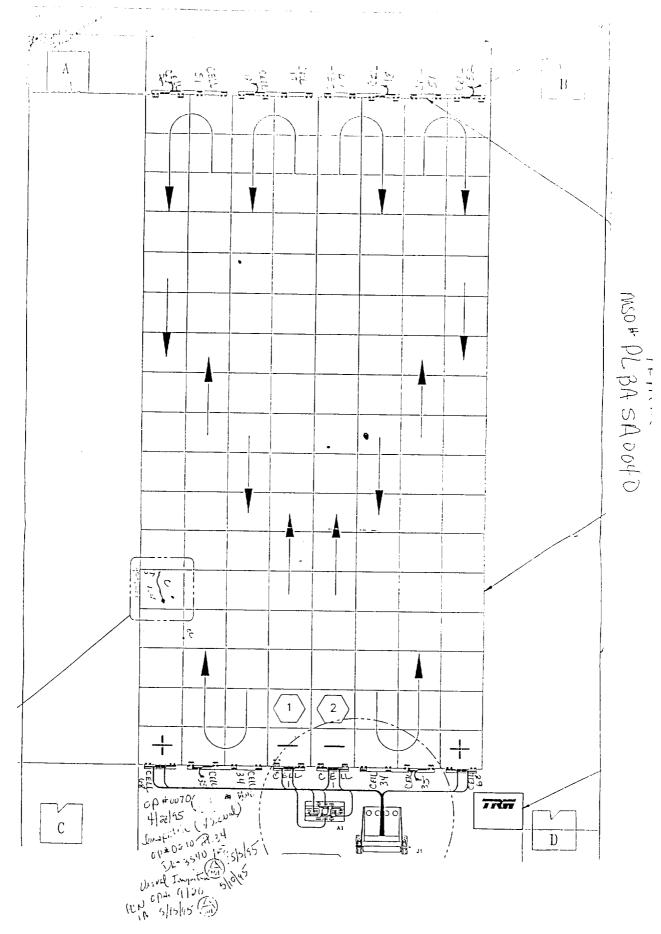
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com. 9195 Visical Prior to delivery No damage to test area. (1)

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REQUEST FOR DEVIATION/WAIVER (continued)

22. Description of Deviation/Waiver

- Reference current specification TRMM-711-058 CCR 0B-0457 Section 3.10.4.1.
- The qualification panel has satisfactorily completed all requirements of this section with the following exception

1 crack on 1 cell appeared during the thermal cycle interval #21 through #1000. The crack does not adversely impact the panel electrical output as demonstrated by post #1000 cycle flash testing. For reference note that this crack was the only one resultant during all the environmental testing (acoustic and thermal cycling). A map of the cell crack is attached.

23. Need for Deviation/Waiver

NASA-GSFC concurrence to proceed with flight cell stack fabrication is required. TRW hereby requests the authorization to initiate the cell glassing process.

JUL DATE (YYMMEND) From Approvid REQUEST FOR DEVIATION/WAIVER OME! No. 0704 0188 95/07/05 (See MIL-STD-480 or 481 for instructions) PROCURING ACTIVITY Public reporting burden for this collection of information is estimated to average 2 hours per response, including this time for reviseeing instructions, shart-hing tribating data boundes, gathering and maintaining the data needed, and completing and maintaining the collection of information. Sand comments repensive that stating data boundes, gathering and maintaining the data needed, and completing and maintaining the collection of information, including supports one for reducing this burden, to Washington Headquarters Services, and expensive or any other about of this collection of information, including supports one formation that the collection of MINEST www.expmens or any owner accord or and cooperation or amandation, according to proposed our recovery and the control of the Office of Information are Directorate for Information Operations and Reports, 1215 Jeffordon David Highway, Suite 1204, Arington, VA 22202-4302, and to the Office of Information are Regulatory Affairs, Office of Management and Budget, Washington, DC 20003. 1. ORIGINATOR NAME AND ADDRESS X WAVER DEVIATION TRW Space & Electronics Group X MINOR MAJOR CRITICAL 6. OTHER SYSTEM CONFIGURATION S. BASELINE AFFECTED MENS AFFECTED 4. DESIGNATION FOR DEVIATION WAIVER FUNCTIONAL ALLOCATED c SYS. DESIG. ADEWKAYER NO. A CAGE CODE YES X NO 2 MODEL TYPE W001 Rev. # PRODUCT 11982 B. DRAWINGS AFFECTED 7. SPECIFICATIONS AFFECTED - TEST PLAN REV. NUMBER CAGE CODE SPECIFICATION/DOCUMENT NO. REV CAGE CODE TRMM-711-058 a SYSTEM CCR 0B-0457 b. ITEM C TEST PLAN 9.2. WEAPON SYSTEM CODE OR DESIGNATION 9. TITLE OF DEVIATIONWAIVER N/A Qual Panel Thermal Cycling 11, PROCURING CONTRACTING OFFICER 10. CONTRACT NO. AND LINE ITEM Joseph Kroener (301) 286-3294 NAS 5-32464 TEL 284.4 12 CLASSIFICATION OR DEFECT 12. CONFIGURATION ITEM NOMENCLATURE c. DEFECT CLASSIFICATION b. DEFECT NO. a. CO NO. X MINOR MAJOR CRITICAL **Qualification Panel** 15, PART NO. OR TYPE DESIGNATION 14. NAME OF LOWEST PARTIASSEMBLY AFFECTED D828370-1-900 Qualification Panel 12. RECURRING DEVIATIONWAIVER 17. QTY 16. LOT NO. X NO YE3 One · N/A 20. EFFECT ON DELIVERY SCHEDULE 19. EFFECT ON COSTAPRICE None None CH. CETTECT ON INTEGRATED LOCASTICS SUPPORT, INTEREME OR SOFTWARE None 22. DESCRIPTION OF DEVIATION WAIVER See attached. 21. NEED FOR DEVIATION WAVER See attached. 24. SERIAL NUMBER(S) AFFECTED N/A 25. SUBJETTING ACTIVITY AUTHORIZED SIGNATURE 594495 Program Manager

DISAPPROVAL

SIGNATURE

DATE (YYNANOD)

10/16

10/16/95

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C. GOVETNMENT ACTIVITY

TRMM

8. GOVERNMENT ACTIVITY

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DISAPPROVED

Lee C. Pekarek

26. APPROVALIDISAPPROVAL

REQUEST FOR DEVIATION/WAIVER (continued)

22. Description of Deviation/Waiver

- Reference original Waiver No. W001, dated 95/06/19.
- This revision is being submitted due to finding an additional crack on the same cell referenced in the original waiver. This revision should be considered an addition to the original Waiver No. W001. The additional crack is documented on the attached road map. The additional crack was discovered during a review of the panel with NASA personnel on 6/28/95.
- Two possibilities exist regarding the occurrence of the additional crack.
 - 1. The additional crack could have existed at the time the original crack, documented in the original waiver, was found and was missed by the two inspectors who independently examined the panel. One of the technical functional managers remarked during the 6/28/95 review that he had seen the additional crack prior to 6/28/95, although he is uncertain as to the exact time frame. No TRMM personnel were aware of any crack other than the one documented in the 6/28/95 review.
 - 2. The additional crack could have occurred after the post-1000 thermal cycle inspection point due to residual stresses in the cell or poor handling. The following operations were performed after the inspection point during which the additional crack could have occurred:

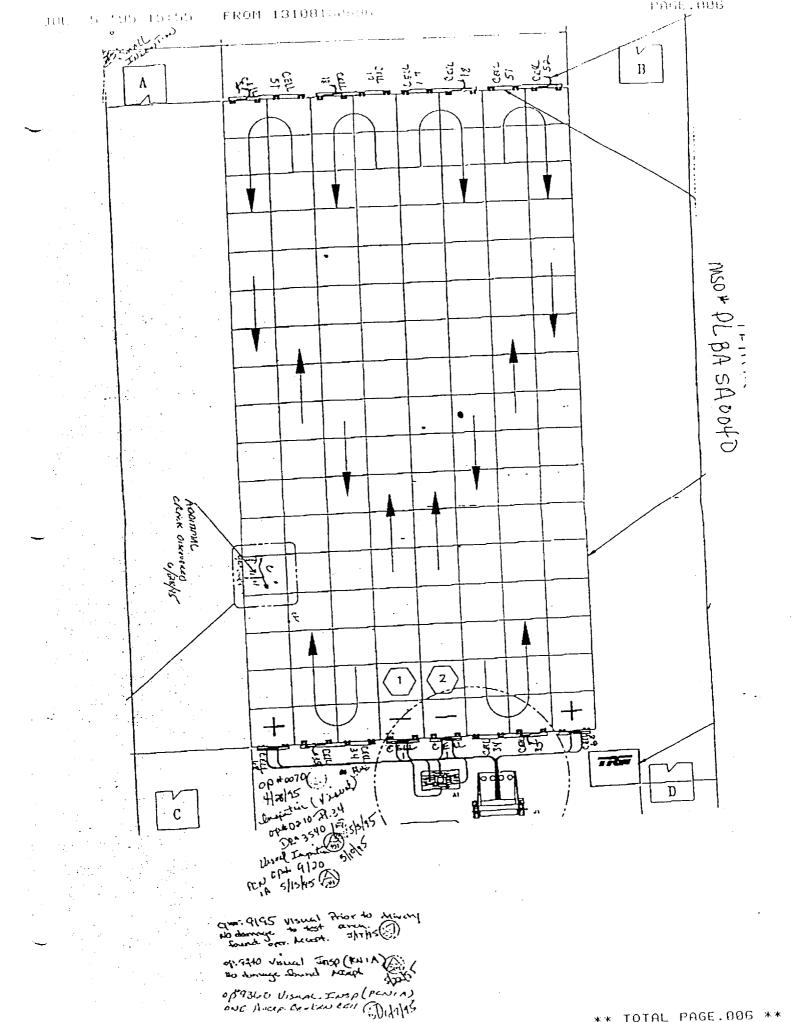
Electrical Flash Test - Two separate sets of tests were performed, each requiring setup and handling.

X-ray Inspection - The panel was transported to another building for this test.

Transportation back to the solar manufacturing and subsequent handling for photography.

After reviewing the additional crack with the two inspectors who performed the post-1000 thermal cycle inspection, it is the position of the Quality Department that the additional crack was not present at the post-1000 thermal cycle inspection point.

TRW maintains that the probability is very high that all cracks in the one cell were caused by a noted defect (a raised area) in the cell and not by an deficiency in the manufacturing process. S. Cabanus of ASEC reviewed the cell on 6/30/95 and indicated that the defect, though not know for certain, was probably a flaw in the germanium substrate.



National Aeronautics and Space Administration

Goddard Space Flight Center

Greenbeit, MD 20771



Reply to Attn of

214.3

October 17, 1995

Ms. Pamela Jackson
Sr. Contracts Administrator
TRW Space & Technology Division/Space & Electronics Group
One Space Park
Redondo Beach, CA 90278

SUBJECT: Contract NAS5-32464, Request for Deviations/Waivers W001-Rev. 1 & W004

As previously communicated to TRW verbally, Request for Waiver No. W001-Rev. 1 entitled "Qual Panel Thermal Cycling" is approved. Also, Request for Waiver No. W004 entitled "Fibers in Cell Backside Solder Joint" is approved contingent upon the understanding that TRW will inspect with polarized light and strive to use foam tip swabs and uncut lint free wipes in the cleaning operations to reduce the number of fibers in the solder joints.

The executed forms entitled "Request for Deviation/Waiver (DD Form 1694)" are enclosed. Please call Mr. Joseph Kroener, Contract Specialist, at (301) 286-3294 if you have any questions.

J. Steve Metcalf

Contracting Officer

REQUEST FOR DEVIATION/WAIVER

(See MIL-STD-480 or 481 for instructions)

DATE (YYMMDD)

95/08/14

Form Approved OMB No. 0704-0188

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23. NEED F	OR DEV	IATION/	WAIVER									
				a. The cells sha	ll degrad	le no mo	re than 3%	in p	eak power.			
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Report Number: RR3769

*** DEFECT DESCRIPTION ***

AT OPER. 250 (FORWARD 4 MEASUREMENT) THE FOLLOWING CELLS OUTPUT DECREASE BY MORE THAN 4%

BT3 IS 4.2220, BT6 IS 15.3159, BT12 IS 4.1649, BT14 IS 4.8170, BT15 IS 4.6522 AND BT19 IS 5.8250 ALL S/B 4% OR LESS.

*** DISPOSITION INSTRUCTIONS/REMARKS ***

Use as is. This test is informational and the data shall be used for engineering purposes. The limit designated as 3% maximum loss was used to trigger a close watch on the cells under test by the RDE. Since this has now occured, the procedure for data review will be changed to require Specific RDE review of data after each segment of thermalelectrical cycling. A waiver shall be generated to allow continuance of the test through o the end without additional Discrepancy reports to be written against this output loss defect of any and all cells on the panel.

Disposition: A - MRB Use-As-Is

Approvals for Material Non-Conformance

PR: Manufacturing: A. Wojtalewicz QA: L. J. Irwin

Date: 11-AUG-95 Date: 11-AUG-95

MRB: Engineering: M. A. Kruer QA: L. J. Irwin Date: 14-AUG-95

Date: 14-AUG-95

Govt: Manufacturing:

Date: Date:

*** RETEST INSTRUCTIONS ***

*** OVERSTRESS STATEMENT ***

Cause: 9A - Under investigation (TBD)

Responsibility: 03 - S&TD/MS&TPC Unable to Determine/Other

Corrective Action: 9A - Under investigation (interim)

This Document For Reference Only - See Computer for Current Data Date Printed: Mon Aug 14 12:22:16 1995

Page: 4

Report Number: RR3769

__o. Prior Occurrences: 0

No. Recurrences:

C/A ECD:

C/A Actionee:

*** CAUSE ***
UNDER INVESTIGATION

*** CORRECTIVE ACTION ***

UNDER INVESTIGATION

Total Line Cost: \$0

*** COST COMMENTS ***

Material Costs: \$

For Reference Only - See Computer for Current Data Date Printed: Mon Aug 14 12:22:17 1995
Page: 5

National Aeronautics and Space Administration

Goddard Space Flight Center Greenbelt, Maryland 20771

734.4

August 16th, 1995

Lee Pekarek program manager for TRMM Solar Array NASS-32464 TRW Space and Electronic Group One Space Park Redondo Beach, CA 90278

SUBJECT: Disposition of reverse bias test panel:

As per our verbal agreement GSFC approves the TRW intention to replace the TRMM reverse bias panel in the thermal cycling chamber to finish the full thermal cycling testing.

734.4/ Ms. Vickie Moran

Duchal Mekan

cc:

734.4/ Mr. Ed Gaddy 734.4 Richard Stegeman 303 / Paul Frazer 722.2/ Jon Lawrence Halis is Aeromautics and Space Administration

Goddard Space Flight Center

Greenbelt, MD 20771



Reply to Attn of

284.4



August 22, 1995

Ms. Pamela Jackson Sr. Contracts Administrator TRW Space & Technology Division/Space & Electronics Group One Space Park Redondo Beach, CA 90278

SUBJECT: Contract NAS5-32464, Request for Deviations/Waivers W002 & W003

Request for Waiver No. W002 entitled 'Reverse Bias Test Panel" is approved. Request for Deviation No. W003 entitled "Glassing" is approved contingent upon the following conditions:

- 1) All uncured adhesives must be removed after the back side soldering and prior to panel assembly; and
- 2) This relaxation of the coverglass void criteria shall not change the final power requirement as called for in the specification.

The executed forms entitled "Request for Deviation/Waiver (DD Form 1694)" are enclosed. Please call Mr. Joseph Kroener, Contract Specialist, at (301) 286-3294 if you have any questions.

J. Steve Metcalf Contracting Officer

DATE (YYMMDD) Form Approved REQUEST FOR DEVIATION/WAIVER OMB No. 0704-0198 95/08/16 (See MIL-STD-480 or 481 for instructions) Public reporting purgen for this collection of information is estimated to average 2 hours per response, including the time for reviewing PROCURING instructions, searching existing data sources, pathering and maintaining the data needed, and completing and reviewing the collection **ACTIVITY** of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including NUMBER auggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of 1. ORIGINATOR NAME AND ADDRESS DEVIATION WAIVER TRW Space & Electronics Group X MINOR MAJOR CRITICAL OTHER SYSTEM CONFIGURATION 5. BASELINE AFFECTED 4. DESIGNATION FOR DEVIATION/WAIVER ITEMS AFFECTED FUNCTIONAL ALLOCATED c. DEV/WAIVER NO c. SYS. DESIG b. CAGE CODE a. MODEL TYPE YES X NO X PRODUCT 11982 W003 B. DRAWINGS AFFECTED 828373 7. SPECIFICATIONS AFFECTED - TEST PLAN REV NUMBER CAGE CODE SPECIFICATION/DOCUMENT NO REV. CAGE CODE TRMM-711-058 a. SYSTEM b. ITEM c. TEST PLAN S.A. WEAPON SYSTEM CODE OR DESIGNATION 9. TITLE OF DEVIATION/WAIVER Glassing 11. PROCURING CONTRACTING OFFICER 10. CONTRACT NO. AND LINE ITEM Joseph Kroener TEL (301) 286-3294 NAS 5-32464 284.4 CODE 13. CLASSIFICATION OR DEFECT 12. CONFIGURATION ITEM NOMENCLATURE C DEFECT CLASSIFICATION b. DEFECT NO. a. CD NO. CRITICAL Flight Solar Cell Stacks POLAM X MINOR 15. PART NO. OR TYPE DESIGNATION 14. NAME OF LOWEST PART/ASSEMBLY AFFECTED £28373 Solar Cell Stacks 18. RECURRING DEVIATION/WAIVER 17. QTY 16. LOT NO X NO 9248 YES N/A 20. EFFECT ON DELIVERY SCHEDULE 19. EFFECT ON COST/PRICE 21. EFFECT ON INTEGRATED LOGISTICS SUPPORT, INTERFACE OR SOFTWARE N/A 22. DESCRIPTION OF DEVIATION/WAIVER See attached. 23. NEED FOR DEVIATION/WAIVER Minor variances to glassing void specification discovered during cell stack inspection under magnification. Additionally a few instances (less than 4 units of 2700 inspected) show evidence of uncured adhesive around the cell edges. Deviation requested to minimize MRB activity, attendant handling, and significant schedule delays. 24. SERIAL NUMBER(S) AFFECTED 25. a. TITLE 25. SUBMITTING ACTIVITY AUTHORIZED SIGNATURE Program Manager 16 AUG 95 Lee Pekarek DISAPPROVAL 26. APPROVAL/DISAPPROVALa, RECOMMEND DATE (YYMMDD) SIGNATURE c. GOVERNMENT ACTIVITY b. APPROVAL 21 Aug 45 APPROVED when catur DISAPPROVED DATE (YYMMDD) SIGNATURE e. GOVERNMENT ACTIVIT d. APPROVAL APPROVED DISAPPROVED

* contingent upon the satisfaction of conditions #1 + #2 in letter Jated Aug 17, 1445 regarding wood.

Request for Deviation/Waiver

23. Description of Deviation/Waiver

The new glassing criteria for TRMM cell stacks shall be as follows:

- 1. Allowable adhesive-free area for any single bubble or void is 2 mm diameter.
- 2. The total allowable adhesive-free area from allowable bubbles or voids shall be less than or equal to 1% of the total area, or 0.176 cm².
- 3. Bubbles or voids less than 0.2 mm diameter or equivalent area may be disregarded when summing for the total allowable adhesive-free area defined above.

For the cell edges, defined as any area physically in contact with any edge of the cell, the allowable adhesive-free area from voids, bubble, tearouts, or scalloping is 5% of the total cell area, or 0.88 cm² subject to the following:

- 1. Contiguous voids, bubbles, tearouts or scalloping less than 0.2 mm diameter or equivalent area may be disregarded when summing to this total allowable area.
- Contiguous adhesive-free areas with greater than 1% of the cell area or 0.176 cm² shall have the overhanging edge of the glass greater than or equal to 3 mils (or 0.08 mm), overriding the standard glassing allowance.
- 3. Any uncured adhesive may be left to the next level of assembly, where it will be evaluated after vapor degreasing.

The glassing criteria for module level inspection shall be the same as the cell stack criteria except cell stacks with uncured adhesive after assembly cleaning shall be referred to MRB.

Goddard Space Flight Center

Greenbelt, MD 20771



Reply to Attn of

284.4



August 22, 1995

Ms. Pamela Jackson
Sr. Contracts Administrator
TRW Space & Technology Division/Space & Electronics Group
One Space Park
Redondo Beach, CA 90278

SUBJECT: Contract NAS5-32464, Request for Deviations/Waivers W002 & W003

Request for Waiver No. W002 entitled 'Reverse Bias Test Panel" is approved. Request for Deviation No. W003 entitled "Glassing" is approved contingent upon the following conditions:

- 1) All uncured adhesives must be removed after the back side soldering and prior to panel assembly; and
- 2) This relaxation of the coverglass void criteria shall not change the final power requirement as called for in the specification.

The executed forms entitled "Request for Deviation/Waiver (DD Form 1694)" are enclosed. Please call Mr. Joseph Kroener, Contract Specialist, at (301) 286-3294 if you have any questions.

J. Steve Metcalf Contracting Officer National Aeronautics and Space Administration

Goddard Space Flight Center

Greenbelt, MD 20771



Fee v to Attn of 734.4

August 17, 1995

Mr. Lee Pekarek, Program Manager TRMM Solar Array Contract NAS5-32464 TRW Space and Electronic Group One Space Park Redondo Beach, CA 90278

Dear Mr. Pekarek:

We have reviewed the letter "Solar Cell Glassing Adhesive Inhibition & Washout" and the Request for deviation / Waiver. GSFC approves the request with conditions.

Condition #1: All uncured adhesive shall be removed after the back side soldering and prior to panel assembly.

Condition #2: This relaxation of the coverglass void criteria shall not change the final power requirement as called for in the Specification.

Yow Vickie Moran

TRMM Power System Engineer

cc:

284.4/ Mr. S. Metcalf 303 / Mr. L. Moore 722.2/ Mr. J. Lawrence 734.4/ Mr. E. Gaddy

734.4/ Mr. R. Stegeman (J&T)

REQUEST FOR DEVIATION/WAIVER

(See MIL-STD-480 or 481 for instructions)

DD Form 1694, JUL 88

DATE (YYMMDD)

95/09/20

Form Approved OMB No. 0704-0188

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REQUEST FOR DEVIATION/WAIVER

(See MIL-STD-480 or 481 for instructions)

DATE (YYMMDD) 96/02/28

Form Approved OMB No. 0704-0188

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Request for Deviation Waiver No. W005 (continued)

23. Need for Deviation/Waiver

- Tape pull test was not performed.
 - This is viewed by contractor as a destructive test which would cause additional cells to be purchased, increasing the contract cost significantly.
 - Waiver of this task was agreed to at the CDR in 1993. A copy of the action items listing submittal of this waiver is attached.

REQUEST FOR DEVIATION/WAIVER

(See MIL-STD-480 or 481 for instructions)

DATE (YYMMDD) 96/02/28

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OMB No. 0704-0188

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Request for Deviation Waiver No. W006 (continued)

23. Need for Deviation/Waiver

- Test not performed due to inability of coating to withstand test.
 - On a sample lot submitted to the test, 3/4 of the coating thickness abraded off after rubbing with the eraser.
- Coating did survive the 17,000 thermal cycle qual panel requirement and the 12 cycle flight thermal vacuum requirement. No AR coating degradation observed.

REQUEST FOR DEVIATION/WAIVER

DD Form 1694, JUL 88

(See MIL-STD-480 or 481 for instructions)

DATE (YYMMDD) 96/02/28

Form Approved OMB No. 0704-0188

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Request for Deviation Waiver No. W007 (continued)

- 23. Need for Deviation/Waiver
 - Test not performed due to inability to pass test.
 - Sample testing yielded absorptance values of .89-.90 versus a requirement of .87. The .89-.90 values are consistent with the standard values of the ASEC Ge/GaAs cell (TRMM and EOS).

REQUEST FOR DEVIATION/WAIVER

(See MIL-STD-480 or 481 for instructions)

DATE (YYMMDD) 96/02/28

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Acce	lera	ted hu	ımidity	test per S	Section	n 4.1.	0.1	not pe	ertormed (on all c	ontact	
evap	orat	ion lo	ts.									_
23. NEED FO						<u></u>						
}			•									
See	alla	ched.										
24. SERIAL N	IUMB F	R(S) AFF	ECTED		,							
1			rray pa	inels								
				ED SIGNATURE			25. a.	TITLE				
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26. APPROV			. 1 7	ECOMMEND [APPRO			ISAPPROV		<u></u>		
b. APPROVAL			VERNMENT				SIGNAT				DATE (YY	'MMDD)
APPROVE	ΞD	33					• • •	_				
DISAPPR												<u> </u>
d. APPROVAL		e. GO\	VERNMENT	ACTIVITY		T	SIGNATI	URE			DATE (Y)	YMMDD)
APPROVE DISAPPRO												
DD Form 1694,		3	<u>,, , , , , , , , , , , , , , , , , , ,</u>			 →						

Request for Deviation Waiver No. W008 (continued)

23. Need for Deviation/Waiver

- Accelerated humidity test was not performed on approximately 85% of the evaporation lots.
 - Existing project manager and lead engineer thought requirement was negotiated out. No written evidence to support this position exists.
 Original project manager has left TRW.
 - Humidity test being performed as follows as agreed to with E. Gaddy of NASA.
 - Two cells each from 7 evaporation lots (14 cells total) from the 1100 cell shipment received for ASEC 1/96 will be interconnected and submitted into the 30-day test.
 - Two cells from the previous 10,000 cell shipments will be interconnected and submitted into the 30-day test.

REQUEST FOR DEVIATION/WAIVER (See MIL-STD-480 or 481 for instructions)

DATE (YYMMDD) 96/07/16

18. RECURRING DEVIATION/WAIVER

NO

[x]

YES

20. EFFECT ON DELIVERY SCHEDULE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing PROCURING ACTIVITY instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of NUMBER formation. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions or reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503. ORIGINATOR NAME AND ADDRESS X DEVIATION WAIVER **TRW Space & Electronics Group** One Space Park Redondo Beach, CA 90278 MINOR MAJOR CRITICAL 6. OTHER SYSTEM/CONFIGURATION 5. BASELINE AFFECTED 4. DESIGNATION FOR DEVIATION/WAIVER ITEMS AFFECTED FUNCTIONAL ALLOCATED d. DEV/WAIVER NO. c. SYS. DESIG. a. MODEL TYPE b. CAGE CODE YES NO D002 X PRODUCT 11982 8. DRAWINGS AFFECTED 7. SPECIFICATIONS AFFECTED - TEST PLAN REV. CAGE CODE NUMBER SPECIFICATION/DOCUMENT NO. REV. CAGE CODE **TRMM 711-058** a. SYSTEM b. ITEM TEST PLAN 9.a. WEAPON SYSTEM CODE OR DESIGNATION 9. TITLE OF DEVIATION/WAIVER **Center of Mass Deviation** 11. PROCURING CONTRACTING OFFICER 10. CONTRACT NO. AND LINE ITEM NAS5-32464 TEL 13. CLASSIFICATION OR DEFECT 12. CONFIGURATION ITEM NOMENCLATURE c. DEFECT CLASSIFICATION b. DEFECT NO. a. CD NO. CRITICAL **TRMM Solar Panel Assemblies** X MINOR MAJOR 15. PART NO. OR TYPE DESIGNATION 14. NAME OF LOWEST PART/ASSEMBLY AFFECTED 828350-1, 828360-1

17. QTY

N/A

N/A

N/A 21. EFFECT ON INTEGRATED LOGISTICS SUPPORT, INTERFACE OR SOFTWARE

16. LOT NO.

N/A

Solar Panel

19. EFFECT ON COST/PRICE

22. DESCRIPTION OF DEVIATION/WAIVER

Center of mass for in board panels is within 7.64cm versus 2.5cm requirement. See Section 3.5 of final verification matrix for CG measurements, 7.64cm = sq. root (107.95 - 101.24) 2 + (110.49 - 106.83) 2 .

23. NEED FOR DEVIATION/WAIVER

Center of mass of the two in board panels (+ Y and - Y) does not fall within the prescribed 2.5cm of each other per paragraphs 3.5 and 4.5.

24. SERIAL NUMBER(S) AFFECTED 0000E0 4 and 0000E0-1

828350-1 and 8	328360-1		
25. SUBMITTING ACT	TIVITY AUTHORIZED SIGNATURE 1/17/96	25. a. TITLE	
L.C. Pekarek	J.C. Terast	Program Manager	
26. APPROVAL/DISA	APPROVAL a. RECOMMEND	APPROVAL	DISAPPROVAL
ZO. AFFROVALIDISA		SIGNATURE	DATE (YYMMDD)
b. APPROVAL	c. GOVERNMENT ACTIVITY	SIGNATURE	
☐ APPROVED			
DISAPPROVED			DATE (YYMMDD)
d. APPROVAL	e. GOVERNMENT ACTIVITY	SIGNATURE	DATE (TIMMOD)
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DISAPPROVED			

DATE (YYMMDD) Form Approved OMB REQUEST FOR DEVIATION/WAIVER (See MIL-STD-480 or 481 for instructions) 96/07/16 No. 0704-0188 Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing PROCURING ACTIVITY nstructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of NUMBER formation. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions or reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503 ORIGINATOR NAME AND ADDRESS X DEVIATION WAIVER TRW Space & Electronics Group One Space Park Redondo Beach, CA 90278 CRITICAL MAJOR x MINOR OTHER SYSTEM/CONFIGURATION 4. DESIGNATION FOR DEVIATION/WAIVER 5. BASELINE AFFECTED **ITEMS AFFECTED** d. DEV/WAIVER NO. FUNCTIONAL ALLOCATED a. MODEL TYPE b. CAGE CODE c. SYS. DESIG. YES X PRODUCT D003 11982 8. DRAWINGS AFFECTED 7. SPECIFICATIONS AFFECTED - TEST PLAN RFV. CAGE CODE NUMBER SPECIFICATION/DOCUMENT NO. REV. CAGE CODE TRMM 711-058 a. SYSTEM b. ITEM c. TEST PLAN 9.a. WEAPON SYSTEM CODE OR DESIGNATION 9. TITLE OF DEVIATION/WAIVER Post T/V Broken Cell Quantity 11. PROCURING CONTRACTING OFFICER 10. CONTRACT NO. AND LINE ITEM NAS5-32464 13. CLASSIFICATION OR DEFECT 12. CONFIGURATION ITEM NOMENCLATURE c. DEFECT CLASSIFICATION b. DEFECT NO. a. CD NO. **TRMM Solar Panel** X MINOR MAJOR CRITICAL 15. PART NO. OR TYPE DESIGNATION 14. NAME OF LOWEST PART/ASSEMBLY AFFECTED 828340-1 Solar Panel 18. RECURRING DEVIATION/WAIVER 17. QTY 16. LOT NO. X. YES NO N/A 20. EFFECT ON DELIVERY SCHEDULE 19. EFFECT ON COST/PRICE N/A 21. EFFECT ON INTEGRATED LOGISTICS SUPPORT, INTERFACE OR SOFTWARE 22. DESCRIPTION OF DEVIATION/WAIVER +Y Outboard Panel experienced 56 cracked cells after thermal vacuum test. All cracked cells were subsequently replaced. 23. NEED FOR DEVIATION/WAIVER Section 3.10.4.2 limits number of cracked cells caused by thermal vacuum to 46. Note: However total cracked cells on the panel were 100 total, versus an allowance of 138 total. 24. SERIAL NUMBER(S) AFFECTED 828340-1 25. a. TITLE 25. SUBMITTING ACTIVITY AUTHORIZED SIGNATURE **Program Manager** L.C. Pekarek DISAPPROVAL **APPROVAL** 26. APPROVAL/DISAPPROVAL a. RECOMMEND DATE (YYMMDD) **SIGNATURE** c. GOVERNMENT ACTIVITY b. APPROVAL **APPROVED** DISAPPROVED DATE (YYMMDD) SIGNATURE e. GOVERNMENT ACTIVITY d. APPROVAL APPROVED

Requirements vs. Verification

Requirement	Title	Requirement (from TRMM-	Verification		Verification Technique
Paragraph		(11-038)	ralaylapii	1	11-11-
3.1	Configuration	Title	4.1		l itle
3.1.1	Solar array System	Title	4.1.1		Title
3.1.1.1	Panel Identification	Inspect to requirements of Drawings	4.1.1.1	I	PM-14A-001, Para. 3.4.2 and TRW Drawings 828340, 828350, 828360
3.1.1.2	Substrates (GFE)	Inspect to GSFC Drawings	4.1.1.2	_	Receiving QA Inspection
3.1.1.3	Solar array Harnessing	Title	4.1.1.3	-	Manufacturing Readiness Review,
3.1.1.3.1	Component Harnessing				PM-14A-001, Para. 3.8
3.1.1.3.2	Interpanel Harnessing	Include continuity through harnesses			<u>.</u>
					828387-1 PLBBHAO420, 828387-2 PLBBHAO430, 828389-1 PLBBHAO440
3.1.1.3.3	Array to Observatory Harmessing				GSFC analysis
3.1.2	Solar Array Panel Configuration	Cells to be laid in series as shown. No circuit more than 106.5 cm length. 94% of circuits shall lie outside shadowed zone.	4.1.2	-	Cells meet series direction requirement. All circuits except 3 on -Y inner and 1 on each of + and - Y outer less than 71 cm length. 91% lie completely outside, 6% are obscured 9%, 1 obscured 100%, total unshadowed area = 96.5%. GSFC approved all Drawings
3.1.2.1	Wiring	Title	4.1.2.1		
3.1.2.1.1	String Wiring	Wiring to be as shown in figure		I, T	RDE and Product Design review , PM-14A-001, Para. 3.4.2 and TRW Drawings 828340, 828350, 828360 PM-14A-001, para 3.8

3.1.2.1.2	Panel Wiring	Wiring to be as shown in figures 13 and 14		I,	RDE and Product Design review , PM-14A-001, Para. 3.4.2 and TRW Drawings 828340, 828350, 828360 PM-14A-001, para 3.8
64 F	Cualification Panel Wintig 18.				
3.1.2.2	Component Layout	Title	4.1.2.2		
3.1.2.2.1	Cell Side Configuration	Title			
3.1.2.2.1.1	Flight Panel Cell Side Configuration	Meet figures 15 and 16 conceptually		–	RDE and Product Design review , PM-14A-001, Para. 3.4.2 and TRW Drawings 828340, 828350, 828360
312212	Qualification Panetice Side	A CONTRACTOR OF THE PARTY OF TH		Section 1	
312213	Test Panel Cell Side Willing	125 48 (116) 12 (116) 13 (116) 14 (116) 16 (116)			
3.1.2.2.1.4	Cell Side Component Clearances	All components extend less than 6mm above panel cell side		-	RDE and Product Design review , PM-14A-001, Para. 3.4.2 and TRW Drawings
		surface			828340, 828350, 828360, notes 21 and 22.
3.1.2.2.2	Rear Components Layouts	Title		-	RDE and Product Design review , PM-14A-001, Para. 3.4.2 and TRW Drawings 828340, 828350, 828360
3.1.2.2.2.1	Flight Panels	Rear layouts to meet GD1514119 and GD1514120.		-	RDE and Product Design review , PM-14A-001 Para 3.4.2 and TRW Drawings
		All components to be bonded to facesheet			828340, 828350, 828360
31222	Qualification Panel Residence				N. O. Tris (en la Company)
3.1.2.2.2.3	Rear Component Clearances	All components extend less		ı	RDE and Product Design review ,
		than 5.7mm above panel except terminal boards(TB), diode			PM-14A-001, Para. 3.4.2 and TRW Drawings 828340, 828350, 828360, notes 21, 22, and 26.
		boards (DB), and connector			
		TB, DB and CA shall not			
		intersect back to back folding of inner to outer panel together			

	A GSFC analysis		+0 power = 1014 W +1 power = 960 W -0 power = 971 W -1 power = 971 W -1 power = 1022 W Total delivered power = 3967W b) PM-14A-001 para. 3.6.3.2 c) Data Available d) Submitted Waiver A Performed at CDA,(predicted 827.9W/panel) revised as follows: +0 power = 811 W @ 51.8 V -0 nower = 812 W @ 51.8 V	 T a) MSO #'s PLBBSA0100, PLBBSA0080 Met requirements. b) PM-14A-001, para 3.7 +O 1100 MΩ -O 1200 MΩ -I 1200 MΩ
	4.2	4.2.1	4.2.2	4.3
)	Voc<125V @ BOL, Vpm>48V @ EOL	Title	a) Each parier 2 5 0.00 (2) 58.9V Total power = 3914.4 W Measured at Connector (828430) or Diode Board anodes (828350, 828360) No anomalous readings caused by defects allowed. b) Verify measurement is same through redundent paths. c) Corrected and uncorrected data to be made available. d) Measure spectral response of the standard and one cell from the first, middle, and last lot of flight cells. Supply I-V predictions for end of life Expected 3311.6 W	> 100 Megohms shall be maintained between each circuit and the aluminum substrate. a) Measure resistance of dielectric prior to laydown b) Measure resistance after laydown
	Power	Power Output Under Test Conditions	Flight Panel BOL Current-Voltage Output Qualification Pantel BOL Current-Voltage Cutput End-of-Life (EOL) Electrical Power Output for Flight Panels	Circuit Insulation
	3.2	3.2.1	3.2.1.1	3.3

4.4 T Actual add on PVA weights: (PM-14A-001, para. 3.10) +0 kg = 8.31 (18.30 lbs.) +1 kg = 8.43 (18.59 lbs.) -0 kg = 7.88 (17.38 lbs.) -1 kg = 8.41 (18.55 lbs.) Margin of 0.64 kg	4.5 T PM-14A-001, para 3.10.3 CG's measured as follows: (top, right side) +0 = 108.23 cm, 106.73 cm +1 = 107.95 cm, 110.49 cm -0 = 104.75 cm, 106.98 cm -1 = 101.24 cm, 106.83 cm Waiver to be submitted for inner panels	S C I		4.8 A FMEA submitted at CDA 4.9 Title	
Maximum add on electrical weights: +0 kg = 8.38 (18.47 lbs.) +1 kg = 8.17 (18.01 lbs.) -0 kg = 8.36 (18.43 lbs.) -1 kg = 8.76 (19.31 lbs.)	Center fo Gravity (CG) of +O to be within 2.5 cm of CG of -O, CG of +I to be within 2.5 cm of -I	a) Supply certificate of conformance for Magnetic materials weight. < 500 grams kovar allowed b) minimize stray magnetic field through configuration c) Analyze stray magnetic field. < 3 milligauss at spectrometers	a) Visual inspection for Cleanliness b) Bakout panels per 4.7. Use TQCM to verify < 330Hz/hour	High reliability Perform FMEA Title	
Weight	Center of Mass	Magnetic Field	Cleanliness and Contamination Control	Reliability Component and	Sub-assembly
3.4	3.5	3.6	3.7	3.8	D.0

3.9.1	Solar Cells	Title	4.9.1	Title
3.9.1.1	Solar Cell Type	GaAs/Ge	4.9.1.1	covered per Specification 8Y040
3.9.1.2	Solar Cell Contacts and Grids	Vacuum deposited	4.9.1.2	covered per Specification 8Y040
3.9.1.3	Solar Cell Antireflective Coating	Multi layer AR, with good adherence	4.9.1.3	covered per Specification 8Y040
3.9.1.4	Solar Cell Absorptance	α ≤ 0.87	4.9.1.4	α ≤ 0.89
3.9.1.5	Solar Cell Dimensions and Weight	Dimensions specified	4.9.1.5	Alternate size used to meet manufacturer minimum cost covered per Specification 8Y040
3.9.1.6	Solar Cell Electrical Performance	Vmax ≥ 870 mV BOL Pmax ≥ 24.8 mW/cm² (18.33% η)	4.9.1.6	covered per Specification 8Y040 (Note: vendor indicated that Pmax<.870 V, verified) Cell output required only 18.1% η to meet
3.9.1.7	Solar Cell Matching	Match cell outputs to meet		Per drawing instructions, TRW Drawings
3.9.1.8	Solar Cell Bonding	electrical requirements Bond using CV1-1142, 90% coverage, 5 mils thickness	4.9.1.7	Per PM-14A-001, para. 3.5. 5 mils minimum thickness shown as not required per qualification board test.
3.9.1.9	Solar Cell Imperfections	as listed	4.9.1.8	Per PM-14A-001, para.3.4, and D21816
3.9.2	Coverglass	Cover required	4.9.2	covered per Specification 8Y127
3.9.2.2	Coverglass Dimensions	6 mil thickness, overhang all cell sides	4.9.2.2	covered per Specification 8Y127
3.9.2.3	Coverglass Coating	AR coating with UV reflector	4.9.2.3	covered per Specification 8Y127
3.9.2.4	Coverglass Emittance	Normal emittance >0.84	4.9.2.4	covered per Specification 8Y127
3.9.2.5	Coverglass Orientation	Oriented with etched triangle, edges to be even with or overlap cell edges	4.9.2.5	covered per Specification 8Y127. Orientation mark is ink stain on cover edge in lieu of etched triangle.
3.9.2.6	Coverglass Bonding	Use CV4-2500. Bonding imperfections as stated.	4.9.2.6	Per drawing instructions, TRW Drawings 828340, 828350, 828360. Verified per PM-14A-

Requirements

001, para.3.4, and D21816	erglass Imperfections as listed 4.9.2.7 Per PM-14A-001, para 3.4, and D21816
	Coverglass Imperfect
	3.9.2.7

3.9.3	Interconnect	Title	4.9.3	Title
3.9.3.1	Interconnect Material	Contractor to propose.	4.9.3.1	Materials list, TRW Drawings 828340, 828350, 828360
3.9.3.2	Interconnect Design	Contractor shall propose. One connection per 3 cm ² and one connection per cm of cell p-contact length	4.9.3.2	TRW used one per 4.4cm ² and one connection per 1.1 cm cell p-contact length. Verified per PM-14A-001, para. 3.4, and D21816
3.9.3.3	Interconnect Soldering	Use Sn62 soldered per NHB- 5300.4 (3A-2)	4.9.3.3	Materials list, TRW Drawings 828340, 828350, 828360. Verified per PM-14A-001, para.3.4, and D21816
3.9.3.4	Interconnect Welding		4.9.3.4	N/A
3.9.3.5	Interconnect Imperfections	As listed	4.9.3.5	Veriofied per PM-14A-001, para.3.4, and D21816
3.9.4	Wiring	Wiring meet MIL-P-11268	4.9.4	
3.9.4.1	Wire Type	TFE insulated 20, 22, and 26 AWG wire per Mil-W-22759/11	4.9.4.1	Materials list, TRW Drawings 828340, 828350, 828360
3.9.4.2	Wire Soldering	soldered per NHB-5300.4 (3A-2)	4.9.4.2	Drawing notes, TRW Drawings 828340, 828350, 828360, Verified per PM-14A-001, para 3.4, and D21816
3.9.4.3	Wire Layout	use twisted pair wire and bond every 8 cm length	4.9.4.3	Layout, TRW Drawings 828340, 828350, 828360. Verified per PM-14A-001, para 3.4, and D21816
3.9.4.4	Wire Bonding	Contractor proposed	4.9.4.4	Used CV-1142. Verified per PM-14A-001, para. 3.4, and D21816
3.9.4.5	Wire Imperfections	As listed	4.9.4.5	Per PM-14A-001, para.3.4 and 3.8, and D21816
3.9.5	Connectors	Title	4.9.5	Title
3.9.5.1	Connector Type	As listed	4.9.5.1	Materials list, TRW Drawings 828340, 828350, 828360, Verified per PM-14A-001, para.3.4, and D21816
3.9.5.2	Connector Mounting	Bonded to substrate, electrically conductive at < 20 milliohms to	4.9.5.2	Per PM-14A-001, para.3.4 and 3.8.2, and D21816

		facesheet		
3.9.5.3	Connector Savers	Use	4.9.5.3	Per PM-14A-001, para 3.4, and D21816
3954	Connector Bakeout	Bakeout 8 hours at 125C in		Drawing notes, TRW Drawings 828340,
		vacuum.		828350, 828360

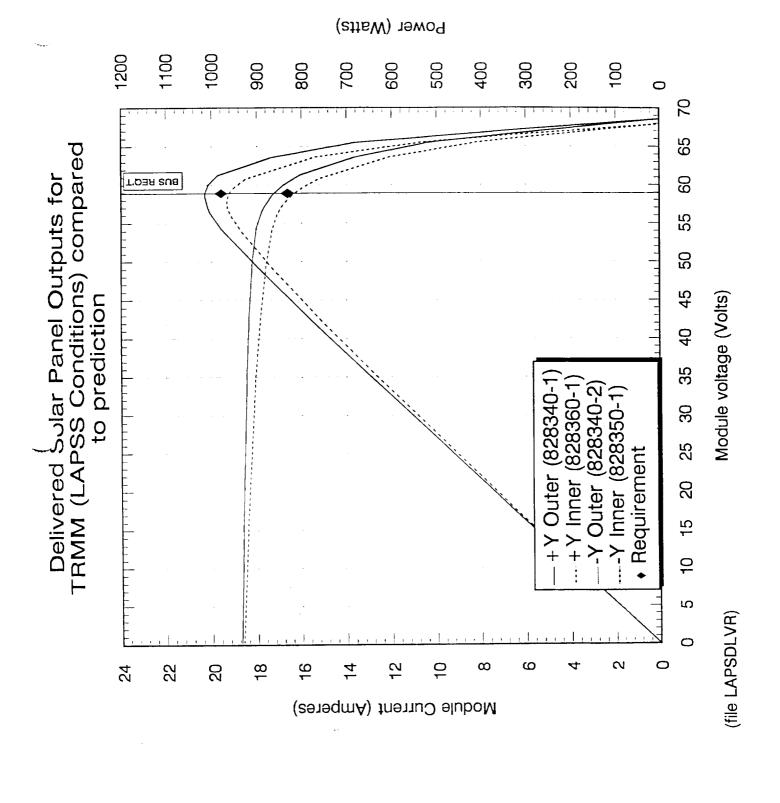
396	Terminal Boards	Title	4.9.6	
3.9.6.1	Diode Type	Use JANTXV 1N5811 $V_1 \le 0.925 \text{ V}$ at I_L $I_R \le 5\text{mA}$ at maximum V_{oc}	4.9.6.1	Parts list and drawing notes, TRW Drawings 828340, 828350, 828360. Verified per PM-14A-001, para.3.4 and 3.9, and D21816
3.9.6.2	Diode Configuration	Mount between two terminal posts with stress relief. Post to body distance ≤ 1cm. Solder per NHB-5300.4(3A)	4.9.6.2	Drawing notes, TRW Drawings 828340, 828350, 828360, Verified per PM-14A-001, para.3.4, and D21816
3.9.6.3	Diode Terminal Board Layout	Contractor designed. Insulated from rear facesheet.	4.9.6.3	Drawing notes, TRW Drawings 828340, 828350, 828360, Verified per PM-14A-001, para.3.4, and D21816
3.9.7	Thermistors	Title	4.9.7	Title
3.9.7.1	Thermistor Type	YSI 44907. 10,000 ohm ± 1% at 25°C	4.9.7.1	Materials list, TRW Drawings 828340, 828350, 828360 verified per PM-14A-001, para 3.8.3
3.9.7.2	Thermistor Mounting	Bond 2 thermistors on back of front facesheet.	4.9.7.2	TRW Drawings 828340, 828350, 828360
		Solder leads to terminal strip on		
		back facesheet. Bond strip with approved adhesive		
3.10	Environmental	Title	4.10	Title
-	Requirements			
3.10.1	Storage Temperature and Humidity	Meet requirements after specified storage and	4.10.1 C, T	T Basis for certification provided at CDA.
		a) Humidity Test one cell from each contact evaporation lot with < 1.5% power loss		a) Humidity test performed on last available lot samples. Deviation approval required.
3.10.2	Minor Accidental Damage	Broken and/or malfunctioning parts must be replaceable and meet all other requirements	4.10.2 T	Panels are reworkable and have been reworked.

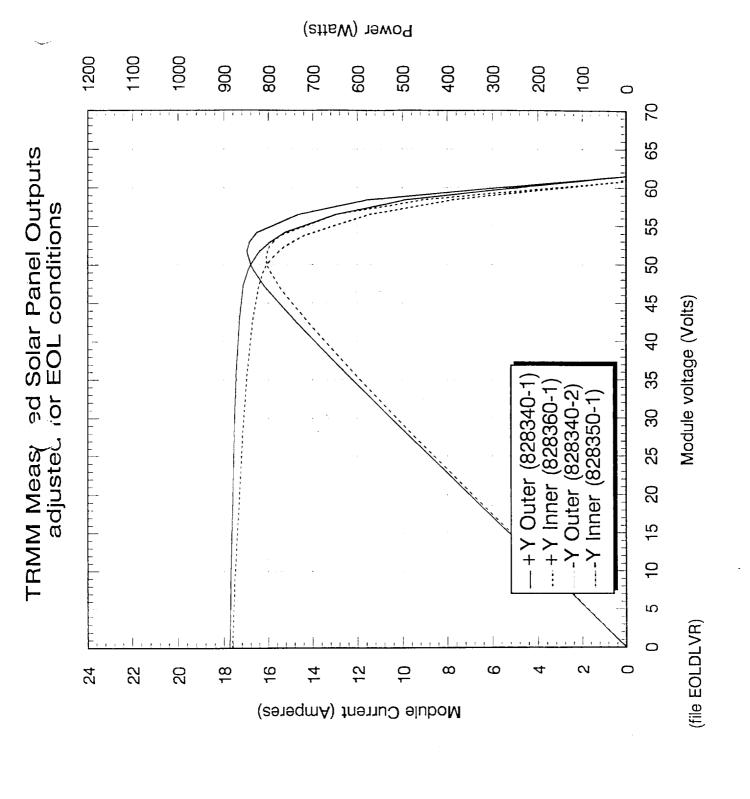
3.10.3	Acoustic Noise	Title	4.10.3	
3 10.3 1	Qualification Panel *			T. N/A this reviews to the second sec
3.10.3.2	Flight Panels	Suspend panels with natural		T Test results per PM-14A-001, paragraphs 3.11
		frequeny ≤ 25 Hz		and 4.3
		Expose to Environment of Table 7 TRMM-711-058		
		a) ≤ 92 acceptable cracks		
		allowed		a) No acceptable cracks found
		b) no measurable degradation		E
		of any string		b) No string with power loss >1% (test repeatability error)
3.10.4	Thermal	Title	4.10.4	
3.10.4.1	Qualification Panel (T/C)			T N/A this reviews:
3.10.4.2	Flight Panel (TV)	12 cycles, +90C to -88C.		T Test results per PM-14A-001, paragraphs
	,	a) Degradation shall be within	_	3.12.3 and 4.5\
		allowances to meet		a) < 2% 828340-1, < 1% 828360-1,
		requirements of 3.2.1.1		0% 828340-2, 0% 828350-1
		b) No continuity failures.		
		c) <46 acceptable cracks allowed	•	Total Delivered Power = 3967 Watts @ 58.9V
				b) No continuity failures
				c) Total Cracks after TV = no acceptable cracks
3.10.5	Ultraviolet Radiation	Degradation ≤ 2.4% power	4.10.5	T. Submitted similarity test data at CDA
				ν.
3.10.6	Charged Particle	Degradation allowances.	4.10.6	A, Submitted vendor qualification by similarity
	Radiation	<pre>< 0.3% lsc; < 0.2% Voc < 0.5% Pmp; < 0.2% Vmp</pre>		S data for cells at CDA
3.10.7	Atomic Oxygen	Array shall degrade <1% due to	4.10.7	A, Analysis submitted at CDA, Incorporated
		Atox		§ provisions of 8.1, Compton GRO similarity
3.10.8	Micrometeoroids and	Show negligible degradation at 3.5 years	4.10.8	A Submitted at CDA
		0.0 years		

Title Transfer of the second o	Transportation Title	Transportation Title Title	Transportation			Handling and Handle per Hardpoints of I	and one	Shadowind a) RB1 all cells per 7.1 4.10.9 T	Shadowing a) RBT all cells per 7 1	Shodowine a) BRT all colle nor 7.1	Shadowing a) RBT all cells per 7.1 b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax c) Shadow Test full string, 28C and 80C Corder of tests, Flight Corder of tests, Flight Panel Packaging Install protective covers on each panel, two panels per container ("+" or "-"), two containers Marking A.10.19 T A.10.11 I A.10.11 I Packaging Per MIL-STD-129 I Parking Per MIL-STD-129 I Packaging Per MIL-STD-129
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Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Darkaging Marking Handling and GD1514203 and GD1514205 Testing of Methods Total Atox Protection	Order of tests, Flight Panel Packaging Marking Handling and Handle per Hardpoints of Transportation Testing of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Test Packaging Marking Handling and Handle per Hardpoints of Transportation Toesting of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Date of tests, Flight A.10.11 Install protective covers on each panel, two panels per container ("+" or "-"), two containers ("+" or "-"), two containers Marking Handling and Handle per Hardpoints of GD1514205 Transportation I GD1514203 and GD1514205	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging Install protective covers on each panel, two panels per container ("+" or "-"), two containers Marking Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight 4.10.11 I Handling and GD1514203 and GD1514205	Order of tests, Flight Darker of tests, Flight Corder of tests, Flight Darker of tests, Flight A.10.11 Install protective covers on each panel, two panels per container ("+" or "-"), two containers ("+" or "-"), two containers I handling and GD1514203 and GD1514205 Transportation I handle per Hardpoints of GD1514205	Order of tests. Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging Danel, two panels per container ("+" or "-"), two containers Marking Der MIL-STD-129		b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	F-
Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging Marking Handling and Charles of tests, Flight Charles of tests, Flight Order of tests, Flight A.10.11 A.10.11 A.10.12 Install protective covers on each panel, two panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Testing of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging Marking Marking Handle per Hardpoints of Transportation Testing of Methods Title	Order of tests, Flight Carder of tests, Flight Darkaging Narking Handling and Handle per Hardpoints of Transportation Testing of Methods Transportation Testing of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Corder of tests, Test Panel Packaging Marking Handling and Handle per Hardpoints of Transportation Order of tests, Flight A.10.11 A.10.11 Install protective covers on each panel, two panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight A.10.11 A.10.11 I Handling and GD1514203 and GD1514205	Order of tests, Order of tests, Flight Packaging Danel, two panels per container ("+" or "-"), two containers Marking Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight 4.10.11 A.10.12 I Handling and GD1514203 and GD1514205	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight A.10.11 I Packaging Install protective covers on each panel, two panels per container ("+" or "-"), two containers Marking Handling and Handle per Hardpoints of Transportation Handle per Hardpoints of GD1514203 and GD1514205 Transportation Order of tests, Flight 4.10.11 I Handle per Hardpoints of GD1514205	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging panel, two panels per container ("+" or "-"), two containers Marking per MIL-STD-129 I A.10.11 I A.10.11 I A.10.11 I A.10.11 I A.10.11 I A.10.11 I A.10.12 I A.10.12 I A.10.13 I A.10.13 I A.10.13 I A.10.13 I A.10.13 I A.10.13 I A.10.14 I A.10.15 I A.10.16 I A.10.11 I A.10.11 I A.10.11 I A.10.11 I A.10.12 I A.10.13 I A.10.13 I A.10.13 I A.10.13 I A.10.13 I A.10.14 I A.10.15 I A.10.15 I A.10.16 I A.10.11 I A.10.11 I A.10.11 I A.10.11 I A.10.12 I A.10.11 I A.10.13 I A.10.13 I A.10.13 I A.10.13	F —	b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	1
Order of tests, Flight Order of tests, Flight Daried Order of tests, Flight Daried Order of tests, Flight Daried Darkaging Darking Darking Order of tests, Flight Darkaging Darking Da	Order of tests, Flight Order of tests, Flight Order of tests, Flight Daniel Marking Handling and Transportation Order of tests, Flight Order of tests, Flight A.10.11 A.10.12 A.10.12 A.10.11 A.10	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Test Packaging Marking Handling and Handling and Conder of tests, Test Packaging Marking Handling and Handle per Hardpoints of Transportation Testing of Methods Title	Order of tasts, Qualification Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging Marking Handling and Handle per Hardpoints of Transportation Order of tests, Flight A.10.11 A.10.12 A.10.12 A.10.12 A.10.12 Install protective covers on each panel, two panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight A.10.11 A.10.12 A.10.12 A.10.12 Install protective covers on each panel, two panels per containers A.10.11 I Handling and GD1514205	Crider of tests, Flight Order of tests, Flight Packaging Marking Handling and Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight 4.10.10 4.10.11 Install protective covers on each panel, two panels per containers ("+" or "-"), two containers Handling and GD1514203 and GD1514205 I	Order of tests, Flight Corder of tests, Flight Packaging Packaging Marking Handling and Handle per Hardpoints of Transportation Corder of tests, Flight A.10.11 A.10.12 A.10.12 A.10.12 Install protective covers on each panel, two panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Corder of tests, Flight A.10.11 A.10.12 A.10.12 A.10.13 Install protective covers on each panel, two panels per containers ("+" or "-"), two containers Install protective covers on each panel, two panels per containers A.10.11 Install protective covers on each panel, two panels per containers A.10.12 Install protective covers on each panel, two panels per containers A.10.12 Install protective covers on each panel, two panels per containers A.10.12 Install protective covers on each panel, two containers A.10.12 Install protective covers on each panel, two containers A.10.12 Install protective covers on each panel, two containers A.10.12 Install protective covers on each panel, two containers A.10.12 Install protective covers on each panel, two containers A.10.12 Install protective covers on each panel, two containers A.10.12 Install protective covers on each panel, two containers A.10.12 A.10.12 A.10.12	Order of tests, Flight Order of tests, Flight Order of tests, Test Packaging Marking Order of tests, Test ("+" or "-"), two container Container of tests or t	E	b) RBT 10 cells @ low and high T temperature, <3% degradation @ Pmax	b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	b) RBT 10 cells @ low and high temperature, <3% degradation @ Pmax	
Order of tests. Order of tests. Order of tests, Flight Order of tests, Flight Order of tests, Flight Darkaging Marking Handling and Conder of tests	Conder of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Danel of tests, Flight Darel Dare	Order of tests, Flight Order of tests, Flight Order of tests, Flight Danel Order of tests, Flight Danel Order of tests, Flight Danel	Chrder of tests, Flight Order of tests, Flight Corder of tests, Flight Corder of tests, Test Panel Packaging Marking Handling and Corder of tests, Test Packaging Pac	Order of tests, Flight Drackaging Danel, two panels per container ("+" or "-"), two containers Marking Handling and Handle per Hardpoints of Transportation Charles and SD1514203 and GD1514205 Transportation Charles and Adolf 16 for Transportation Charles and CD1514205 Transportation Charles and CD1514205	Corder of lests, Flight Order of tests, Flight Order of tests, Test Panel Packaging Marking Handling and Handling and Corder of lests, Flight Fight A.10.11 Handling and Handle per Hardpoints of Transportation Corder of tests, Flight A.10.11 A.10.11 A.10.11 A.10.12 A.10.12 A.10.12 A.10.12 A.10.12 A.10.12 A.10.13 A.10.13 I Handling and GD1514203 and GD1514205 Transportation Corder of tests, Flight A.10.10 A.10.11 A.10.11 A.10.12 A.10.12 A.10.12 A.10.13 A.10.13 A.10.14 A.10.14 A.10.15 A.10.14 A.10.15 A.10.15 A.10.16 A.10.17 A.10.10 A.10.17 A.10.17 A.10.17 A.10.17 A.10.17 A.10.17 A.10.17 A.10.15 A.10.16 A.10.17 A.10.16 A.10.17 A.	Order of tests, Flight Order of tests, Flight Order of tests, Flight Drackaging Marking C) Shadow Test full string, 28C A.10.10 A.10.11 A.10.11 Install protective covers on each panel, two panels per container ("+" or "-"), two containers C Shadow Test full string A.10.11 I A.10.12 I A.10.13 I A.10.12 I A.10.12 I A.10.13 I	E	b) RBT 10 cells @ low and high T temperature, <3% degradation	b) RBT 10 cells @ low and high temperature, <3% degradation	b) RBT 10 cells @ low and high T temperature, <3% degradation	
Order of tests, Flight Packaging Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Install protective covers on each panel, two panels per containers ("+" or "-"), two containers ("+" or "-"), two containers Transportation Handle per Hardpoints of GD1514203 and GD1514205 Transportation Testing of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Darker of	Order of tests, Flight Order of tests, Flight Order of tests, Flight Darkel Order of tests, Flight Order of tests, Flight Packaging Pa	Criter of tests, Cualification Order of tests, Flight Order of tests, Flight Order of tests, Flight Darkaging Marking Handling and Handle per Hardpoints of Transportation Criter of tests, Flight A.10.11 A.10.11 A.10.12 A.10.13 A.10.11 A.10.13 A.10.13	Order of tests, Cualification Order of tests, Flight Order of tests, Flight Panel Packaging Marking Handling and Handling and Conder of tests, Flight A.10.11 A.10.11 A.10.11 A.10.11 A.10.12 A.10.12 A.10.13 A.10.11 A.10.11 A.10.11 A.10.12 Install protective covers on each panel, two panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Conder of tests, Flight A.10.11 A	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight A. 10.11 I handling and Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight A. 10.12 I handling and GD1514203 and GD1514205	C) Shadow Test full string, 28C and 80C and 80	F	b) RBT 10 cells @ low and high T temperature, <3% degradation	b) RBT 10 cells @ low and high temperature, <3% degradation	b) RBT 10 cells @ low and high temperature, <3% degradation	
Order of tests. Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging Marking Handling and Cesting of Methods To Shadow Test full string. 28C 4.10.11 Install protective covers on each panel, two panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Testing of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Danel Packaging Marking Handling and Handle per Hardpoints of Transportation Testing of Methods Title	© Pmax o) Shadow Test full string, 28C and 80C Order of tests, Flight Order of tests, Flight Panel Drater of tests, Flight Parel Drater of tests, Flight Panel Drater of tests, Flight A.10.11 I A.10.11 I A.10.11 I A.10.11 I Althorities A.10.12 I A.10.11 I	Order of tests, Flight Order of tests, Flight Parel Packaging Marking Handling and Packagion Handle per Hardpoints of Transportation Order of tests, Flight A.10.11 A.10.11 A.10.11 A.10.11 A.10.12 A.10.11 A.10.11 A.10.12 A.10.11 A.10.12 A.10.11 A.10.11 A.10.11 A.10.11 A.10.11 A.10.11 A.10.11 A.10.11 A.10.12 A.10.11 A.10.12 A.10.11 A.10.12 A.10.13 A.10.	Order of tests, Test Cualification Order of tests, Test Packaging Marking Handling and Pare of tests, Test Marking Pare Mardpoints of Transportation Order of tests, Test A 10.11 A 10.11 A 10.11 A 10.11 A 10.12 A 10.13 A 1	Order of tests, Cualification Order of tests, Flight Order of tests, Flight Order of tests, Flight Panel Packaging Marking Marking Handle per Hardpoints of Transportation Order of tests, Flight A.10.11 A.10.11 A.10.11 Install protective covers on each panel, two panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight A.10.11 A.10.11 A.10.11 A.10.12 Install protective covers on each panel, two panels per containers A.10.11 Install protective covers on each panel, two containers Install protective covers on each panel, two panels per container A.10.11 Install protective covers on each panel, two containers Install protective covers on each panel, two panels per containers Install protective covers on each panel, two panels per containers Install protective covers on each panel, two containers Install protective covers on each panel, two panels per containers Install protective covers on each panel, two cover	© Pmax c) Shadow Test full string, 28C and 80C Order of tests, Flight Order of tests, Flight Packaging Packaging Order of tests ("+" or "-"), two containers Marking © Pmax ("+" or "-"), two containers ("+" or "-"), two containers Packaging Per MilL-STD-129 Per MilL-STD-	E	b) RBT 10 cells @ low and high T temperature <3% degradation	b) RBT 10 cells @ low and high T temperature <3% degradation	b) RBT 10 cells @ low and high T temperature <3% degradation	
Order of tests. Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Darkaging Marking Handling and Handle per Hardpoints of Transportation Testing of Wethods Title	© Pmax c) Shadow Test full string, 28C and 80C Order of tests, Flight Order of tests, Flight Darker of tests, Test Packaging Marking Handling and Handle per Hardpoints of Transportation Testing of Methods Title	© Pmax c) Shadow Test full string, 28C and 80C Order of tests, Flight Order of tests, Flight Packaging Danel, two panels per container ("+" or "-"), two containers Handling and Handle per Hardpoints of Transportation Testing of Methods Title	© Pmax c) Shadow Test full string, 28C and 80C Order of tests, Flight Order of tests, Flight Dark Order of tests, Flight Dark Order of tests, Flight Packaging Fackaging Marking Handling and Handle per Hardpoints of Transportation © Phmax c) Shadow Test full string, 28C 4.10.10 4.10.11 I Handling and GD1514203 and GD1514205 I Handle per Hardpoints of GD1514203 and GD1514205	© Pmax c) Shadow Test full string, 28C and 80C Order of tests, Flight Order of tests, Flight Danel of tests, Test Panel Packaging Danel, two panels per container ("+" or "-"), two containers Handling and Handle per Hardpoints of Transportation © Phmax ("+" or "-"), two containers Handling and GD1514203 and GD1514205	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Test Packaging Marking Handling and Garding and Gardinar Charler of tests, Flight A.10.11 A.10.11 A.10.11 A.10.12 A.10.12 A.10.12 A.10.12 A.10.12 A.10.12 A.10.12 A.10.12 A.10.13 A.10.11 A.10.11 A.10.11 A.10.12 A.10.13 A.10.13 A.10.13 A.10.11 A.10.12 A.10.13 A.10.1	© Pmax c) Shadow Test full string, 28C and 80C Cutalification Order of tests, Flight Daniel Packaging Install protective covers on each panel, two panels per container ("+" or "-"), two containers Marking © Pmax 4,10,18 1 4,10,17 1 Marking Der MIL-STD-129 I	E	b) RBT 10 cells @ low and high	b) RBT 10 cells @ low and high	b) RBT 10 cells @ low and high	
Order of tests, Flight A.10.11 Install protective covers on each panel, two panels per containers ('+' or "-'), two containers ('+' or "-'), two containers I Handle per Hardpoints of GD1514203 and GD1514205 Transportation Cesting of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Darkaging Marking Handling and Testing of Methods Title	Order of tests, Flight Danel	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Packaging Marking Handling and Handle per Hardpoints of Transportation Conder of tests, Flight A 10.11 A 10.11 A 10.11 A 10.11 A 10.12 A 10.13 A 10.12 A 10.12 A 10.13 A 10.12 A 10.13 A 10.13 A 10.14 A 10.15 A 10.11	Order of tests, Flight Order of tests, Flight Darking Marking Handling and Order of tests, Flight Order of tests, Flight Packaging Packaging Parking Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight A 10.11 A 10.11 A 10.12 A 10.13 A 10.13 A 10.14 A 10.14 A 10.15 A 10.11 A 10.12 A 10.11 A	Order of tests, Flight Panel Panel Order of tests, Flight Danel Order of tests, Flight Order of tests, Flight A.10.11 Install protective covers on each panel, two panels per container ("+" or "-"), two containers ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Handle per Hardpoints of Transportation	Order of tests, Flight Packaging Marking Der MIL-STD-129 Inches of tests o	E	b) RBT 10 cells @ low and high	b) RBT 10 cells @ low and high	b) RBT 10 cells @ low and high	- -
Crear of tests, Flight Conder of tests,	Content of tests Content of	Content of tests. Flight Flight Content of tests. Flight C	Conder of tests, Flight Conder of tests,	temperature, <3% degradation @ Pmax c) Shadow Test full string, 28C and 80C Order of tests, Flight Order of tests, Flight Packaging Packaging Marking Handling and Handle per Hardpoints of Transportation Content of tests Content	Conder of tests, Flight Conder of tests,	Crider of tests, Flight Corder of tests, Flight A.10.12 A.10.13 A.10.12 A.10.11 A.10.11 I panel, two panels per containers ("+" or "-"), two containers A.10.12 A.10.12 A.10.12 A.10.11 I panel, two panels per containers A.10.12 A.10.13 A.10.11 A.10.11 I panel, two panels per containers A.10.12 A.10.11 A.10.11 A.10.11 A.10.12	E	1) DDT 40 000 100 000 000 000 000 000 000 000	1.00.1.4 Annual March 1.00.1.4 Annual March 1.00.1 Annual March 1.	Silauowilig a) Ivol all cells per 7.1 4:10.9	
Contact of tests, Flight Contact of tests, F	Order of tests, C) Shadow Test full string, 28C and 80C and 80C Order of tests, Flight Order of tests, Flight Order of tests, Test Panel Packaging Marking Handling and Handle per Hardpoints of Transportation Testing of Methods Title	Corder of tests, Flight Order of tests, Flight Darkaging Marking Handling and Handle per Hardpoints of Transportation Testing of Methods Title	Order of tests, Flight Order of tests, Flight Order of tests, Flight Darkaging Marking Handling and Handle per Hardpoints of Transportation Order of tests, Flight Order of tests, Flight A.10.11 A.10.11 A.10.12 A.10.13 A.10.13 A.10.13 A.10.14 A.10.15 A.10.15 A.10.10 A.10.17 A.	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight Danel wo panels per container ("+" or "-"), two containers Handling and GD1514203 and GD1514205 Transportation Order of tests, Flight A.10.11 A.10.11 A.10.12 I Handling and GD1514203 and GD1514205	Order of tests, Flight A-10.11 Danel wo panels per container ("+" or "-"), two containers Handling and Handle per Hardpoints of Transportation Order of tests, Flight A-10.11 A-10.11 A-10.12 I Handle per Hardpoints of Characterian (The part Hardpoints of tests) Transportation Order of tests, Flight A-10.11 I Handle per Hardpoints of tests I Handle per Hardpoints of tests Transportation Order of tests, Flight A-10.11 A	Cruter of tests, Flight Order of tests, Flight Order of tests, Test Packaging Marking Derivation ("+" or "-"), two containers Derivation ("+" or "-"), two containers Derivation Derivation ("+" or "-"), two containers Derivation ("+" or "-"), two containers Derivation Derivation ("+" or "-"), two containers Derivation Deriv	- E-		7 COI:t	Siladowiiig all coils per 7.10.8	h) BBT 10 cells @ low and bigh
Di RBI 10 cells @ low and high temperature, <3% degradation @ Pmax c) Shadow Test full string, 28C and 80C and	b) RBI 10 cells @ low and high reperature, <3% degradation @ Pmax c) Shadow Test full string, 28C and 80C and	Drief of tests, Flight Order of tests, Flight Drawlel Packaging Install protective covers on each panel, two panels per containers ("+" or "-"), two containers I Handling and GD1514203 and GD1514205 Transportation Testing of Methods Title	Druter of tests, Charles (a) low and high ph RBI 10 cells (a) low and high (b) RBI 10 cells (a) low and high (b) RBI 10 cells (a) Shadow Test full string, 28C and 80C	Drder of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Flight A-10.11 Drawallification Order of tests, Flight A-10.12 Drawallification A-10.11 A-10.11 A-10.12 A-10.12 A-10.12 A-10.12 A-10.12 A-10.13 A-10.13 A-10.14	Drader of bests. Order of tests, Flight Order of tests, Flight Packaging Marking Handling and Drader of tests Order of tests, Flight Order of tests, Flight Packaging Parking Handle per Hardpoints of Transportation Handle per Hardpoints of Transportation Drader of tests, Flight A.10.11 A.10.11 Install protective covers on each panel, two panels per containers ("+" or "-"), two containers Handling and GD1514203 and GD1514205	Order of tests, Flight Order of tests, Flight Order of tests, Flight Order of tests, Test Panel Packaging Marking Directive covers on each penel; two containers Der MIL-STD-129 Directive covers on tests Der MIL-STD-129	E E				

Space Debris

7.1	Requirements	Reverse Bias cells to 1.1 lsc, Document # screened and # passed	7.2	H	7.2 T Performed per Subcontract # HD6790GG3S, PID 92-1764 paragraph 3.2.2.2
8.0	Incorporation of Methods to Pro Harnesses on the Flight Panels	ods to Protect Against / ht Panels	Atomic Ox	yger	ncorporation of Methods to Protect Against Atomic Oxygen Erosion of the Solar Array Harnesses on the Flight Panels
8.1	Requirements	Implement 10, 11, 12 of Table 9 of TRMM-711-058		_	8.2 I PM-14A-001, Para. 3.4.2 and TRW Drawings 828340, 828350, 828360





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Panel 360-1 Post Thermal Vacuum

Panel 340-1 Post Thermal Vacuum		17 60.6158 x 1028.9863 line item output at x 58.9 x volts
	1 55.6923 2 54.0466 3 58.4195 4 55.2493 5 55.3366 6 57.4283 7 55.1702 8 58.4765 9 57.6619 10 54.2787 11 62.6833 12 61.6815 13 52.3611 14 55.9995 16 53.9877	17 62.5880 970.3066 line item output at x 58.9 volts

Panel 360-1 Post Thermal Vacuum

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-	Ā	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
		455	×	68.21412	0.007	0.332849	0.49%	0.477499	61.12562	0.006635	0.405572
7	2	0.9176 x	×	65.41824	9.1693	0.06454	0.10%	599.8394	58.33533	8.691253	507.0071
ر ا	3	0.9918	×	63.52824	12.6954	0.06044	0.10%	806.5164	56.44911	12.03352	679.2814
4	4	0.9380 ×	×	60.61353	15.6076	0.300498	0.50%	946.0317	53.54023	14.79389	792.0682
2	5	0.9395 x	×	59.91529	15.9999	0.060634	0.10%	958.6387	52.8434	15.16574	801.409
9	9	0.9750 ×	×	59.26235	16.34242	0.265507	0.45%	968.4905	52.19176	15.4904	808.4713
-	7	× 29367 ×	×	58.9	16.4770	0.0986	0.0017	970.4836	51.83013	15.6436	810.7961
. ∞	8	0.9928 x	×	58.81765	16.50757	0.060676	0.10%	970.9366	51.74794	15.67839	811.3245
6	6	× 0626.0	×	57.87118	16.8386	0.283679	0.49%	974.4696	50.80337	15.99279	812.4876
2	10	0.9215 x	×	56.93059	17.0532	0.05984	0.11%	970.8487	49.86466	16.19661	807.6385
=	11	1.0642 x	×	55.80941	17.2186	0.275419	0.49%	960.9599	48.74572	16.3537	797.1731
12	12	1.0472 ×	×	53.72765	17.4118	0.261833	0.49%	935.495	46.66812	16.5372	771.7601
13	13	× 06880	×	48.89529	17.6728	0.248347	0.51%	864.1168	41.84544	16.78509	702.3794
4	14	× 8056.0	×	41.99941	17.9283	0.198761	0.47%	752.9781	34.96334	17.02776	595.3473
15	15	1.0059 x	×	34.43118	18.129	0.165563	0.48%	624.2028	27.41025	17.21837	471.9599
16	16	0.9166 x	×	14.95294	18.518	0.018291	0.12%	276.8986	7.970967	17.58783	140.1921
12	17	1.0626 x	×	-0.47376	18.697	0.060307	-12.73%	-8.85798	-7.42489	17.75784	-131.85
18 ×		16.4738 x	×	Vave	Suml	Vstdev	Vstdv%	power	V corr	Icorrr	Pcorr
19	ine item	output at	×								
× 20		58.9	×								
21		volts	×								

Panel (1 Post Thermal Vacuum

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J4074) } }	•		<	,				<	
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-	1.0169 x		68.76765	0.0124	0.085186	0.12%	0.8527188	61.67804	0.011754	0.724934
2	1.0552 x	_	65.45235	11.0005	0.055625	0.08%	720.00861	58.36938	10.42698	608.6165
3	1.0500 x	~	63.56176	14.2705	0.052943	0.08%	907.05816	56.48257	13.5265	764.0115
4	1.0148 x	_	61.14118	16.4975	0.086305	0.14%	1008.6766	54.06683	15.63739	845.4642
5	1.0013 ×	×	59.94412	17.091	0.050628	0.08%	1024.5049	52.87216	16.19995	856.5264
9	1.0361 x	×	59.75765	17.1817	0.082426	0.14%	1026.738	52.68606	16.28592	858.0411
7	1.0383 ×	×	58.9	17.4698	0.0459	0.0008	1028.9581	51.83013	16.5905	859.8749
8	1.0371 ×	×	58.85118	17.48622	0.043858	0.07%	1029.0845	51.78141	16.60788	859.9793
6	1.0185 x	×	58.37176	17.64	0.085603	0.15%	1029.6779	51.30295	16.75394	859.5264
10		×	56.96647	17.92	0.04782	0.08%	1020.8392	49.90047	17.01987	849.2996
11	0.9934 x	×	56.29529	18.034	0.084935	0.15%	1015.2293	49.23064	17.12815	843.2295
12		×	54.19765	18.235	0.077583	0.14%	988.29409	47.13718	17.31905	816.3712
13	1.0198 x	×	49.35353	18.411	0.068915	0.14%	908.64783	42.30275	17.48621	739.7148
4	1.0361 x	×	42.36529	18.54	0.060324	0.14%	785.45255	35.3285	17.60873	622.0899
15	1.0303 x	×	34.72765	18.639	0.051542	0.15%	647.28861	27.70612	17.70276	490.4748
16	1.0248 x	×	14.95941	18.796	0.012485	0.08%	281.1771	7.977425	17.85187	142.412
17	1.0291 x	×	-0.53495	18.89	0.018409	-3.44%	-10.105261	-7.48595	17.94115	-134.307
×	17.4701 ×	×	Vave	Suml	Vstdev	Vstdv%	power	V corr	lcorrr	Рсогг
line item	output at	×								
×	58.9	×								
×	volts	×								

-	- (m	ပ	D	Ш	F	၅	H	_	ſ	К	L	W	Z	0	٦	σ	Я
	68.33	0	68.79	0	68.41	0.001	90.89	0	68.18	0	68.29	0	67.91	0.001	68.31	0.001	68.32	0
7	65.51	0.5048	65.44	0.4503	65.4	0.579	65.45	0.4833	65.51	0.5111	65.4	0.5499	65.35	0.4777	65.33	0.5725	65.4	0.5764
က	63.62	0.7059	63.54	0.6648	63.51	0.7868	63.56	0.6901	63.62	0.7138	63.5	0.7587	63.47	0.693	63.44	0.7794	63.51	0.7799
4	60.79	0.8771	60.29	0.8656	60.75	0.9446	60.54	0.8785	60.52	0.8899	29.09	0.9249	96.09	0.8858	60.75	0.9385	60.67	0.9343
2	60.01	0.9123	59.95	0.8835	59.91	0.9652	59.92	0.9034	59.99	0.91	59.89	0.9514	59.85	0.9068	59.83	0.9685	59.88	0.9576
ဖ	59.41	0.9312	58.94	0.9154	59.38	0.9834	59.17	0.9291	59.15	0.9323	59.31	0.9681	69	0.9343	59.4	0.9794	59.31	0.9707
7	58.92	0.9451	58.9	0.9176	58.9	0.9918	58.9	0.9380	58.9	0.9395	58.9	0.9750	58.9	0.9367	58.9	0.9928	58.9	0.9790
80	58.9	0.9455	58.86	0.9198	58.8	0.9936	58.84	0.94	58.9	0.9395	58.8	0.9767	58.76	0.94	58.74	0.9971	58.8	0.981
6	58.03	0.9647	57.58	0.9467	28	1.007	57.79	0.9649	57.77	0.9634	57.93	0.9899	57.64	0.9695	58.01	1.007	57.92	0.9937
9	57.03	0.9868	96.99	0.9524	56.93	1.017	56.94	0.9858	25	0.9757	56.9	0.9995	56.87	0.9848	56.85	1.025	56.9	1.007
=	55.98	0.9975	55.52	0.9586	55.93	1.023	52.75	0.9964	55.74	0.9886	55.89	1.004	55.59	1.005	55.95	1.025	55.86	1.012
12	53.86	1.019	53.45	0.9767	53.85	1.032	53.67	1.013	53.66	0.9958	53.79	1.016	53.49	1.024	53.87	1.032	53.78	1.02
13	49.01	1.0390	48.63	1.0050	49.02	1.0410	48.83	1.0400	48.81	1.0080	48.94	1.0300	48.68	1.0420	48.99	1.0410	48.94	1.0280
4	42.11	1.059	41.78	1.028	42.09	1.054	41.96	1.068	41.96	1.022	42.05	1.04	41.82	1.065	42.1	1.055	42.04	1.038
15	34.52	1.076	34.26	1.046	34.51	1.063	34.39	1.082	34.38	1.032	34.46	1.053	34.29	1.078	34.51	1.069	34.46	1.046
16	14.98	1.101	14.96	1.091	14.97	1.09	14.95	1.103	14.96	1.06	14.93	1.073	14.94	1.099	14.92	1.086	14.95	1.066
17	-0.522	1.104	-0.3457	1.107	-0.4953	1.105	-0.4919	1.111	-0.5034	1.074	-0.3121	1.085	-0.5004	1.107	-0.4873	1.087	-0.5049	1.076
18 <	-		>	_	>	<u> </u>	_ >		_		>	_	>		>	_		
19 182	×		5&6	×	889	×	12&13 ×		14&15 ×		16&17	×	20&21 x		22&23 x		24&25 x	

Panel 360-1 Post Thermal Vacuum

CURRENT-VOLTAGE

	S	F	n	>	8	×	<u>\</u>	Z	AA	AB	AC	AD	AE	AF	AG	АН
-	67.7	0.001	68.67	0.001	68.56	0.001	9.79	0.001	68.23	0	68.36	0	96.79	0	68.86	0
7	65.33	0.4371	65.51	0.6984	65.33	0.6704	62.39	0.3949	65.4	0.5168	65.45	0.5936	65.51	0.4527	65.4	0.7004
က	63.45	0.6557	63.61	0.8956	63.45	0.8713	63.52	0.6142	63.5	0.7255	63.56	0.7982	63.61	0.6692	63.51	0.8933
4	60.18	0.8722	66.09	1.016	60.89	1.005	90.09	0.8419	60.71	0.8946	60.64	0.9576	60.37	0.8711	61.25	1.01
ა	59.83	0.8883	09	1.043	59.84	1.031	59.9	0.8488	59.91	0.9244	59.93	0.979	60.01	0.8827	59.91	1.044
ဖ	58.9	0.9215	59.61	1.05	59.51	1.04	58.9	0.8890	59.32	0.9416	59.29	0.9985	29	0.9119	59.86	1.046
-	58.82	0.9244	58.92	1.064	58.9	1.0472	58.81	0.8926	58.9	0.9508	58.9	1.0059	58.9	0.9166	58.9	1.0626
80	58.75	0.9264	58.9	1.0642	58.75	1.049	58.72	0.8946	58.85	0.9525	58.84	1.007	58.9	0.9166	58.85	1.064
თ	57.44	0.9643	58.23	1.072	58.13	1.062	57.36	0.9343	57.97	0.9697	6.73	1.022	57.64	0.9385	58.47	1.059
9	56.85	0.9748	57.02	1.084	56.85	1.073	56.91	0.9447	56.95	0.9835	56.94	1.031	57.02	0.9442	56.93	1.084
Ξ	55.4	0.9972	56.13	1.088	56.04	1.078	55.28	0.9717	55.89	0.9921	55.84	1.043	55.58	0.9525	56.39	1.086
12	4,	1.007	54.05	1.092	53.96	1.085	53.25	0.9913	53.81	1.002	53.75	1.048	53.51	0.964	54.28	1.094
13	48.55	1.0280	49.23	1.1030	49.16	1.0950	48.46	1.0100	48.96	1.0270	48.91	1.0580	48.68	0.9768	49.45	1.1010
4	1	1.057	42.24	1.108	42.17	1.1	41.64	1.028	42.04	1 037	42.02	1.067	41.82	0.9943	42 43	1.108
15	34.19	1.079	34.66	1.11	34.59	1.103	34.13	1.045	34.47	1.047	34.45	1.08	34.29	1.01	34.77	
9	14.93	1.105	14.97	1,117	14.93	1.106	14.95	1.082	14.96	1.084	14.95	1.092	14.98	1.043	14.97	1.12
1	-0.4954	1.114	-0.4985	1.12	-0.4973	1.114	-0.5098	1.1	-0.4761	1.091	-0.404	1.103	-0.5002	1.077	-0.5097	1.122
78	>		>		>		>	_	>	_	>		>		-	
19	19 26&27	×	30&31	×	33&34	×	18&19	×	3&4	×	10&11	×	7&29	×	26&32 x	

Panel 340-1 Post Thermal Vacuum

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	(2	09 89	0.001	68.76	0 001	68.7	0.001	68.83	0.001	68.82	0	68.71	0.001	68.8	0.001	68.76	0
,	00.00	0000	00.00 EF 46	0.00		0.6727	65.51	0.6236	65.45	0.6214	65.52	0.6569	65.43	0.6559	65.46	0.6558	65.47	0.634
7	02.40	0.0009	00.42	0.0034		0.070	63.62	0.8161	63.56	0.8129	63 63	0.8502	63.53	0.8477	63.57	0.8411	63.58	0.8264
m	63.56	0.8217	03.57	0.004		0.00	00.06	0.00	200	0 0	0.70	2220	04.00	1000	61 10	0.073	61 13	0 9625
4	61.27	0.9478	61.12	1.005	61.14	0.9956	61.05	0.9503	17.19	0.9430	7.10	0.9777	01.00	0.9001	01.13	0.97.0	2 2	0.3023
u	59 94	0 9961	59.96	1.039	59.83	1.031	60.01	0.9879	59.95	0.9754	09	1.011	59.91	1.015	59.94	1.013	59.950	0.995/
, 4	50 BG	0 9957	59.71	1.042	59.76	1.033	29.62	0.996	59.82	0.9843	59.81	1.018	2.65	1.021	59.85	1.017	59.75	1.003
, r	0 0 0	1 017	0 85	1 055		1.050	58.93	1.014	58.9	1.001	58.91	1.036	58.9	1.038	58.9	1.037	58.9	1.018
- -	20.00	20.0				1.053		1.015	58.86	1.002	58.9	1.036	58.85	1.04	58.86	1.038	58.87	1.019
0 0	20.00	1 025				1.059	58.29	1.03	58.43		58.42	1.042	58.31	1.047	58.43	1.046	58.35	1.031
, (20.00	10.5				1.078	57.04	1.043	56.98	1.027	57.02	1.056	56.93	1.062	56.96	1.064	56.96	1.047
= ;	20.30	20.4				1 079	56.21	1.055	56.38		56.33	1.064	56.25	1.069	56.34	1.071	56.28	1.057
=	20.43	000				1 002	54 12	1 068	54 26	1 043	54 24	1.073	54.14	1.08	54.24	1.08	54.18	1.068
12	54.31	1.000		-03				0 0			000	1001		1 088	49.39	1 096	16 94	1 076
13	49.45	1.08	49.33	1.112			49.28	1.082	4.64	400.	00.64	000			200	2	A2 25	100
4	42.45	1.087	42.35	1,119	42.35	1.106	42.29	1.089	42.41	1.068	42.39	1.088	4	90.1	47.4		42.33	5
7.	34 79	1 097	34.71	1.124	34.74	1.111	34.67	1.097	34.77	1.071	34.76	1.092	34.7	1.097	34.77	1.104	34.12	50.1
2 4	14 95	1 112		1.13	14.93	1.12	14.97	1.107	14.97	1.084	14.96	1.102	14.96	1.104	14.95	1.112	14.96	1.095
1	0.5720	1 117	٦	-	-0.5309	1.124	-0.5429	1.113	-0.5684	1.09	-0.5407	1.108	-0.5223	1.11	-0.5037	1.117	-0.5469	1.10
- 8	182 x		28	×	7&8	×	10&11	×	12&13	×	14&15	×	16&17	×	18&19	× .	22823	
-			>	_	>		>	_	>	_	>		>		>		>	

Panel 340-1 Post Thermal Vacuum

CURRENT-VOLTAGE

L	U	- -	-	>	*	×	>	7	AA	AB	AC	AD	AE	AF	AG	AH
+	68 73	0.007	68.56	0	68.97	0.0011	68.78	0.0021	68.77	0.0011	68.77	0	68.78	0	92.89	O
1.	26.75	0.5562	65.45	0.5909	65 46	0 6843	65.42	0.6444	65.32	0.6518	65.53	0.6413	65.51	0.6436	65.45	0.6444
۱,	00.43	0.0002	82 58 52 58	0.222	63.57	0.8688	63.53	0.8366	63.44	0.8461	63.64	0.8383	63.61	0.8362	63.55	0.8366
1	00.00	0.0045	80.00	0.020	61.25	0 9897	61.18	0.9678	61.06	0.9808	61.07	0.9761	61.21	0.9663	61.16	0.973
5 4	50 05	000	59.95	0.952	59.93	1.022	59.91	1.001	59.85	1.016	60.01	1.007	60.01	-	59.95	1.007
2 4	20.00	1 013	59.55	0.9787	59.87	1.024	59.8	1.006	59.69	1.02	59.68	1.014	59.83	1.006	59.78	1.0
0 1	20.70	1 028	58.9	0 993	58.9	1.040	58.9	1.020	58.9	1.036	58.92	1.03	58.93	1.024	58.9	1.029
- 0	2000	1 020	58 86	0 9943	58.85	1.041	58.85	1.021	58.76	1.039	58.9	1.030	58.9	1.025	58.86	1.03
0	20.00 A 8.00	1 038	58 15	1 009	58.47	1.048	58.42	1.034	58.29	1.049	58.31	1.039	58.45	1.036	58 39	1 035
	56.07	1 052	56 97	1 032	56.95	1.063	56.93	1.047	56.88	1.069	57.03	1.057	57.03	1.052	56.97	1.05
٠,٠	20.00	100	56.08	1041	56.39	1.068	56.36	1.057	56.21	1.072	56.23	1.061	56.35	1.06	56.33	1.06
-	200	1 072	25.55	1 059	543	1 079	54.24	1.067	54.12	1.084	54.15	1.074	54.26	1.072	54.24	1.068
7 5	12.40	1.077	49 17	1 072	49 45	1088	49.38	1.074	49.3	1.095	49.3	1.081	49.42	1.086	49.38	1.072
2 ;	15.05	1 084	42.22		42 45	1.095	42.41	1.08	42.31	1.103	42.31	1.089	42.41	1.095	42 39	1.08
ŧ	24 72	780	34 50		34 79	1.102	34.75	1.087	34.69	1.109	34.68	1.093	34.77	1.1	34.75	1.084
2 4	34.12 44.06	1000	14 96	1 107	14.95	1.112	14.97	1.091	14.94	1.119	14.97	1.101	14.98	1,109	14.95	1.095
10	0 5425	1098	-0 5309	1,115	-0.5391	1.118	-0.5197	1.101	-0.527	1.121	-0.5295	1.105	-0.5096	1.118	-0.5193	1.102
				×	30&31	×	33&34 ×		3&4	×	26&27	×	9&21	×	20&32	×
2 0			/		>				>		>		>		>	

Panel 360-1 Post Thermal Vacuum

	4	В	ပ	۵	Э	ட	9	Н	_	7	¥	٦	Σ	z	0	م
-	68.33	0.000	64.89	0.000	68.41	0.068	90.89	0.000	68.18	000.0	68.28	0.000	67.91	0.068	68.31	0.068
7	65.51	33.069	65.44	29.468	65.4	37.867	65.45	31.632	65.51	33.482	65.4	35.963	65.35	31.218	65.33	37.401
3	63.62	44.909	63.54	42.241	63.51	49.970	63.56	43.863	63.62	45.412	63.5	48.177	63.47	43.985	63.44	49.445
4	60.79	53.319	60.29	52.187	60.75	57.384	60.54	53.184	60.52	53.857	29.09	56.114	60.36	53.467	60.75	57.014
ഹ	60.01	54.747	59.95	52.966	59.91	57.825	59.95	54.132	59.99	54.591	59.89	56.979	59.85	54.272	59.83	57.945
မ	59.41	55.323	58.94	53.954	59.38	58.394	59.17	54.975	59.15	55.146	59.31	57.418	59	55.124	59.4	58.176
7	58.95	25.685	58.9	54.047	58.9	58.419	58.9	55.249	58.9	55.337	58.9	57.428	58.9	55.170	58.9	58.476
8	58.9	55.692	58.86	54.139	58.8	58.424	58.84	55.310	58.9	55.337	58.8	57.430	58.76	55.234	58.74	58.570
თ	58.03	55.982	57.58	54.511	58	58.406	57.79	55.762	57.77	55.656	57.93	57.345	57.64	55.882	58.01	58.416
10	57.03	56.277	96.99	54.249	56.93	57.898	56.94	56.131	25	55.615	56.9	56.872	56.87	56.006	56.85	58.271
11	55.98	55.840	55.52	53.221	55.93	57.216	55.75	55.549	55.74	55.105	55.89	56.114	55.59	55.868	55.95	57.349
12	53.86	54.883	53.45	52.205	53.85	55.573	53.67	54.368	53.66	53.435	53.79	54.651	53.49	54.774	53.87	55.594
13	49.01	50.921	48.63	48.873	49.05	51.030	48.83	50.783	48.81	49.200	48.94	50.408	48.68	50.725	48.99	50.999
14	42.11	44.594	41.78	42.950	42.09	44.363	41.96	44.813	41.96		42.05	43.732	41.82	44.538	42.1	44.416
15	34.52	37.144	34.26	35.836	34.51	36.684	34.39	37.210	34.38	35.480	34.46	36.286	34.29	36.965	34.51	36.891
16	14.98	16.493	14.96	16.321	14.97	16.317		16.490	14.96	15.858	14.93	16.020	14.94	16.419	14.92	16.203
17	-0.522	-0.576	-0.3457	-0.383	-0.4953	-0.547	-0.4919	-0.547	-0.5034	-0.541	-0.3121	-0.339	-0.5004	-0.554	-0.4873	-0.530
18	۸ h	_	_	Д	\ \	Ь	^	Д	>	Ь	^	۵.	<u>a</u>		2	
19	19 1&2 ×		5&6	×	889	×	12&13	×	14&15	×	16&17	×	20&21 ×		22&23 ×	

Panel 360-1 Post Thermal Vacuum

POWER

L	σ	A.	S	⊢	n	>	M	×	Υ	7	AA	AB	AC	AD	AE	AF	AG	AH
_	68.32	0.000	67.7	0.068	29.89	0.069	68.56	0.069	9.79	0.068	68.23	000.0	68.36	0.000	96'29	000.0	68.86	0.000
7	65.4	37.697	65.33	28.556	65.51	45.752	65.33	43.797	62.39	25.823	65.4	33.799	65.45	38.851	65.51	29.656	65.4	45.806
ო	63.51	49.531	63.45	41.604	63.61	56.969	63.45	55.284	63.52	39.014	63.5	46.069	63.56	50.734	63.61	42.568	63.51	56.733
4	29.09	56.684	60.18	52.489	66.09	61.966	60.89	61.194	90.09	50.565	60.71	54.311	60.64	58.069	60.37	52.588	61.25	61.863
က	59.88	57.341	59.83	53.147	09	62.580	59.84	61.695	59.9	50.843	59.91	55.381	59.93	58.671	60.01	52.971	59.91	62.546
φ	59.31	57.572	58.9	54.279	59.61	62.591	59.51	61.890	58.9	52.361	59.32	55.856	59.29	59.201	59	53.802	59.86	62.614
_	58.9	57.662	58.82	54.373	58.92	62.691	58.9	61.681	58.81	52.494	58.9	56.000	58.9	59.246	58.9	53.988	58.9	62.588
∞	58.8	57.683	58.75	54.426	58.9	62.683	58.75	61.629	58.72	52.531	58.85	56.026	58.84	59.252	58.9	53.988	58.82	62.584
თ	57.92	57.555	57.44	55.389	58.23	62.423	58.13	61.734	57.36	53.591	57.97	56.214	57.9	59.174	57.64	54 095	58.47	62.504
9	56.9	57.298	56.85	55.417	57.02	61.810	56.85	61.000	56.91	53.763	26.95	55.981	56.94	58.705	57.02	53.838	56.93	61.712
Ξ	55.86	56.530	55.4	55.245	56.13	61.069	56.04	60.411	55.28	53.716	55.89	55.448	55.84	58.241	55.58	52.940	56.39	61.240
12	53.78	54.856	53.34	53.713	54.05	59.023	53.96	58.547	53.25	52.787	53.81	53.918	53.75	56.330	53.51	51.584	54.28	59.382
13	48.94	50.310	48.55	49.909	49.23	54.301	49.16		48.46	48.945	48.96	50.282	48.91	51.747	48.68	47.551	49.42	54.411
14	42.04	43.638	41.72	44.098	42.24	46.802	42.17		41.64	42.806	42.04	43.595	42.02	44.835	41.82	41.582	42.43	47.012
15	34.46	36.045	34.19	36.891	34.66	38.473	34.59	38.153	34.13	35.666	34.47		34.45	37.206	34.29	34.633	34.77	38.595
16	14.95	15.937	14.93	16.498	14.97	16.721	14.93	16.513	14.95	16.176	14.96	16.217	14.95	16.325	14.98	15.624	14.97	16.766
17	-0.5049	-0.543	-0.4954	-0.552	-0.4985	-0.558	-0.4973	-0.554	-0.5098	-0.561	-0.4761	-0.519	-0.404	-0.446	-0.5002	-0.539	-0.5097	-0.572
2	>	ط	>	Q.	>	۵.	>	a.	>	Д	>	Д	>	Ь	>	۵	<u>a.</u>	
5	19 24&25	×	26&27	×	30&31	×	33&34	×	18&19	×	3&4	×	10&11	×	7829	×	26&32 x	

Panel 340-1 Post Thermal Vacuum

	0000	41.508	52.543	58.838	59.692	59 929	59 987	59 989	60,159	59.637	59,488	57.864	53.079	45.907	37.845	16 381	-0.602		Ī
ď	0	41	52	58	59	59		59	9		59	57.	53	45	37	16	Q	×	_
ø	68.76	65.47	63.58	61.13	59.95	59.75	58.9	58.87	58.35	56.96	56.28	54.18	49.33	42.35	34.72	14.96	-0.5469	22823	>
а	0.069	42.929	53.469	59.538	60.719	60.837	61.087	61.097	61.118	60,605	60.340	58.579	54.131	46.640	38.386	16.624	-0.563		
0	68.8	65.46	63.57	61.19	59.94	59.82	58.9	58.86	58.43	56.96	56.34	54.24	49.39	42.4	34.77	14.95	-0.5037	18&19	>
z	690.0	42.916	53.854	59.865	60.809	60.954	61.154	61.173	61.051	60.460	60.131	58.471	53.660	46.140	38.066	16.516	-0.580	×	
Σ	68.71	65.43	63.53	61.08	59.91	59.7	58.9	58.85	58.31	56.93	56.25	54.14	49.32	42.33	34.7	14.96	-0.5223	16&17	>
	000.0	43.040	54.098	59.835	60.660	60.887	61.031	61.028	60.874	60.213	59.935	58.200	53.380	46.120	37.958	16.486	-0.599	×	
¥	68.82	65.52	63.63	61.2	09	59.81	58.91	58.9	58.42	57.02	56.33	54.24	49.38	42.39	34.76	14.96	-0.5407	14&15	>
J	0.069	40.671	51.668	57.758	58.475	58.881	58.974	58.978	59.190	58.518	58.241	56.593	52.068	45.294	37.239	16.227	-0.620	×	
-	68.83	65.45	63.56	61.21	59.95	59.85	58.9	58.86	58.43	56.98	56.38	54.26	49.4	42.41	34.77	14.97	-0.5684	12&13	>
Ξ	690.0	40.852	51.920	58.016	59.284	59.431	59.755	59.769	60.039	59.493	59.302	57.800	53.321	46.054	38.033	16.572	-0.604	×	
ŋ	68.7	65.51	63.62	61.05	60.01	59.67	58.93	58.9	58.29	57.04	56.21	54.12	49.28	42.29	34.67	14.97	-0.5429	10&11	۸
ı.	0.069	43.954	55.242	60.871	61.685	61.732	61.847	61.864	61.824	61.306	60.748	59.165	54.148	46.839	38.596	16.722	-0.597	×	
ш	68.76	65.34	63.46	61.14	59.83	59.76	58.9	58.75	58.38	56.87	56.3	54.18	49.36	42.35	34.74	14.93	-0.5309	78.8	^
۵	0.069	45.128	56.196	61.426	62.298	62.218	62.150	62.146	61.771	61.026	60.581	59.045	54.855	47.390	39.014	16.916	-0.620	×	
ပ	68.69	65.46	63.57	61.12	59.96	59.71	58.9	58.85	58.33	56.98	56.25	54.17	49.33	42.35	34.71	14.97	-0.5479	5&6	>
80	0.000	41.495	52.227	58.072	59.706	59.603	59.895	59.909	59.963	59.808	59.252	57.894	53.406	46.143	38.165	16.624	-0.640	×	
A	68.86	65.46	63.56	61.27	59.94	59.86	58.9	58.85	58.5	56.96	56.43	54.31	49.45	42.45	34.79	14.95	-0.5729	18.2	^
7	-	7	3	4	2	9	7	8	6	9	11	12	13	14	15	16	17	18	19

Panel 340-1 Post Thermal Vacuum

POWER

Γ	U			>	8	×	>	7	VV	AA	ر۷	4	34		1 V	04
1	,	-	2			:		֓֡֓֞֜֜֜֜֜֓֓֓֓֓֓֓֓֓֓֜֜֜֓֓֓֓֓֓֓֓֡֓֜֜֜֓֓֓֓֡֓֡֓֡֓֡֓֡֓֡֓֜֡֓֓֡֓֡֡֡֓֡֓֡֓֡֓֡֓֡֡֡֓֡֓֡֡֡֡֓֡֓֡֡֡֓֜֡֓֡֓֜֡֓֜	5	2	2	2	1	1	1	Č
-	68.73	0.144	99.89	000.0	68.97	0.076	68.78	0.144	68.77	0.076	68.77	0.000	98	68.78	.78 0.000	
2	65.45	42.948	65.45	38.674	65.46	44.794	65.42	42.157	65.32	42.576	65.53	42.024	65.51	-	1 42.162	Ĺ
က	63.55	54.303	63.58	49.770	63.57	55.230	63.53	53.149	63.44	53.677	63.64	53.349	63.61	1	53.191	53.191 63.55
4	61.16	59.662	60.92	56.820	61.25	60.619	61.18	59.210	61.06	59.888	61.07	59.610	61.21		59.147	59.147 61.16
2	59.95	60.490	59.95	57.846	59.93	61.248	59.91	59.970	59.85	60.808	60.01	60.430	60.01	ı	60.010	60.010 59.95
9	59.78	60.557	59.55	58.282	29.87	61.307	59.8	60.159	59.69	60.884	59.68	60.516	59.83	1	60.189	60.189 59.78
^	58.9	60.567	58.9	58.511	58.9	61.266	58.9	60.065	58.9	61.029	58.95	889.09	58.93		60.344	60.344 58.9
8	58.86	60.567	58.86	58.524	58.85	61.263	58.82	60.055	58.76	61.052	58.9	60.684	58.9		60.358	60.358 58.86
6	58.4	60.619	58.15	58.673	58.47	61.277	58.42	60.406	58.29	61.146	58.31	60.584	58.45		60.554	60.554 58.39
9	56.97	59.932	26.92	58.793	56.95	60.538	56.93	59.606	56.88	60.805	57.03	60.281	57.03		59.996	59.996 56.97
+	56.3	59.678	90.99	58.379	56.39	60.225	56.36	59.573	56.21	60.257	56.23	29.660	56.35		59.731	59.731 56.33
12	54.21	58.113	54	57.186	54.3	58.590		57.874	54.12	58.666	54.15	58.157		4,	58.167	8.167 54.24
13	49.37	53.171	49.17	52.710	49.45	53.802	49.38	53.034	49.3	53.984	49.3	53.293	49.42	S.	53.670	3.670 49.38
14	42.39	45.951	42.22	45.724	42.45	46.483	42.41	45.803	42.31	46.668	42.31	46.076	42.41	4	46.439	6.439 42.39
15	34.72	37.741	34.59	37.841	34.79	38.339	34.75	37.773	34.69	38.471	34.68	37.905	34.77	3	38.247	8.247 34.75
16	14.96	16.396	14.96	16.561	14.95	16.624	14.97	16.332	14.94	16.718	14.97	16.482	14.98	-	6.613	6.613 14.96
17	-0.5425	-0.596	9 -0.5309	-0.592	-0.5391	£09 [.] 0-	-0.5197	-0.572	-0.527	-0.591	-0.5295	-0.585	9605.0-	ľ	0.570	0.570 -0.5193
18	24825	×	28&29	×	831	×	33&34	×	3&4	×	26&27	×	9&21	×		20&32
19	>	_	>	_	>		>		^		>		>			^

828340-2 A 7/V Fruer

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							_	_				_		C		Le-				
0.068	37,967	49.782	56.544	57.260	57.154	57.042	57.041	57.011	56.731	56.491	55.257	51.241	44.521	36.750	15.988	-0.860			,	,
68.45	65.55	63.66	61.03	60.04	59.66	58.94	58.9	58.27	57.05	56.21	54.12	49.27	42.32	34.67	14.97	8.0-	24&25 ×	=	×	*
0.00	40.601	51.271	56.803	57.974	58.015	58.264	58.294	58.305	57.877	57.707	56.146	51.873	44.870	36.992	16.037	-0.873	54	>	×	×
68.76	65.37	63.47	61.27	59.89	59.89	58.9	58.77	58.51	56.91	56.41	54.3	49.45	42.45	34.8	14.96	-0.8117	23 ×	_	×	×
0.144	41.000	52.555	58.580	59.714	59.579	59.853	59.887	59.914	59.222	58.959	57.232	52.587	45.422	37.469	16.236	-0.897	22&23	>	×	×
Ĺ.,			_	59.9 59		58.9 59				L.,	54.3 57				14.95	_	×	_	×	×
68.71	65.38	63.48	61.27		59.86		1 58.77	58.51	56.89	56.42		49.47	42.45	34.79		9 -0.821	18&19	>	×	×
0.069	41.219	53.028	59.069	60.110	60.179	60.280	60.283	60.320	59.679	59.312	57.493	52.770	45.548	37.541	16.298	-0.889	×	_	×	×
99.89	65.49	63.59	61.23	59.99	59.85	58.9	28.87	58.45	57	56.38	54.29	49.41	42.41	34.76	14.98	-0.8128	16&17	>		κ
0.000	34.161	46.003	53.178	54.344	54.643	54.905	54.944	54.958	54.839	54.445	52.849	48.682	42.204	35,013	15.448	-0.828				
68.21	65.43	63.54	60.81	59.91	59.45	58.9	58.85	58.04	56.94	55.99	53.9	49.08	42.12	34.53	14.94	-0.7942	14&15 ×		×	•
0.142	27.567	40.621	50.598	51.193	52.132	52.092	52.085	52.644	52.611	52.047	50.626	46.772	40.793	33.786	15.150	-0.833	1	_	×	×
67.8	65.51	63.63	60.38	59.98	59.05	58.9	58.88	99'29	57	55.6	53.51	48.69	41.83	34.3	14.97	-0.8084	12&13 x	_	×	×
-0.068	35.502	47.745	55.348	56.616	56.864	57.135	57.159	57.344	57.054	56.501	54.912	50.738	44.003	36,497	16.071	-0.874	-	>	×	×
68.37	65.43	63.55	61.01	59.93	59.65	58.9	58.83	58.27	56.94	56.22	54.1	49.26	42.27	34.66	14.95	-0.8062	10&11 ×		×	×
0.000	42.25	52.643	57.563	58.966	59.017	59.252	59.262	59.176	58.897	58.431	56.848	52.374	45.422	37,590	16.332	-0.887	=	>	×	×
68.8	65.42	63.54	61.42	59.98	59.94	58.9	58.85	58.59	96.99	56.51	54.4	49.55	42.53	34.87	14.97	-0.8084	× 8*	_	×	×
0.068	33.057	45.361	53.361	54.165	54.697	54.852	54.879	55.097	54.953	54.672	53.206	49.108	42.743	35.411	15.553	-0.847	788	>	×	×
68.18	65.42	63.54	2.09	59.91	59.35	58.9	58.82	57.96	56.94	55.89	53.82	49.01	42.07	34.48	14.94	-0.8036	×		×	×
0.000	31.553	44.932	54.151	54.963	55.571	55.733	55.744	55.798	55.352	54.927	53.436	49.507	43.091	35.745	15.757	-0.863	5&6	>	×	×
68.02	65.49	63.58	60.68	59.97	59.32	58.9	58.87	57.93	56.97	55.86	53.78	48.92	42.04	34.47	14.95	8113	×	<u> </u> _	×	×

	523	518	352	920	046	801	526	543	407	228	185	807	442	128	538	208	009	tat	6	s
2	54.8523	59.2518	57.1352	52.0920	54.9046	60.280	59.8526	58.2643	57.0407	59.225	56.9185	59.280	59.3442	54.712	55.4538	57.1208	971.460	output at	58.9	volts
-	2	9	4	5	9	7	8	6	100	=	12	13	14	15	16	17	×	line item	×	×
_	10				0.			21				01			~	10				
0.00	35.416	47.732	55.105	56.501	56.612	57.121	57.137	57.132	57.094	56.462	54.844	50.712	44.089	36.599	16.112	-0.866	×		×	×
17.00	65.5	63.6	60.89	59.98	59.51	58.9	58.88	58.12	56.98	56.07	53.98	49.14	42.19	34.56	14.96	-0.7969	20&32	>	×	×
-0.058	33.004	45.310	53.670	54.776	55.305	55.454	55.468	55.813	55.627	55.421	53.741	49.286	42.909	35.631	15.828	-0.871	×		×	×
17.80	65.42	63.53	60.83	59.93	59.48	58.9	58.84	58.09	56.96	56.02	53.93	49.09	42.15	34.56	14.96	-0.8074	9&21	>	×	×
0.058	30.529	43.387	52.794	53.757	54.333	54.713	54.753	55.138	55.155	54.614	53.526	49.443	43.053	35.714	15.977	-0.857	×		×	×
F. /O	65.47	63.57	60.46	59.97	59.09	58.9	58.88	57.73	56.99	55.66	53.58	48.76	41.88	34.34	14.96	-0.7925	268.27	>	×	×
-0.003	40.191	51.591	57.831	59.034	59.055	59.344	59.351	59.205	58.860	58.454	56.803	52.071	45.198	37.372	16.291	-0.880	×	_	×	×
98.30	65.5	63.29	61.08	59.97	59.7	58.9	58.88	58.33	56.98	56.26	54.15	49.31	42.32	34.7	14.96	-0.8017	3&4	>	×	×
-0.003	39.833	51.641	57.983	59.073	59.037	59.281	59.301	59.195	58.783	58.142	56.533	51.814	44.859	36.966	16.097	-0.867	*		×	×
000	65.44	63.55	61.08	59.93	59.7	58.9	58.83	58.32	56.96	56.23	54.15	49.3	42.32	34.71	14.96	-0.8009	33&34	>	×	×
0.00	37.366	48.730	55.290	56.418	56.598	56.918	56.947	56.974	56.739	56.425	55.216	50.974	44.193	36.417	15.896	-0.856	×	_	×	×
90.04	65.44	63.55	61.02	59.93	59.64	58.9	58.83	58.25	56.95	56.2	54.08	49.25	42.29	34.65	14.95	-0.8011	30&31	>	×	×
0.00	41.350	52.447	58.162	59.034	59.194	59.223	59.223	59.113	58.907	58.533	56.885	52.424	45.315	37.308	16.176	-0.885	×		×	×
27.89	65.49	63.58	61.23	59.97	59.84	58.9	58.87	58.47	56.97	56.39	54.28	49.41	42.43	34.77	14.95	-0.8138	28829	>	×	×

Page 2

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0.00	44.697	55.55	60,713	61.519	61.379	61.459	61450	61 212		400.74	60.243	58.583	53.845	46.43	2 6	38.278	16,546	-0 875				 	:)	
00./3	65.49	63.59	61.32	96.69	59.94	58.9	58 87	200	200	20.38	56.46	54.35	49.49	42 CA	42.40	34.83	14.96	-0 7912	24020	670				
0.009	42.058	53.388	59.022	59.924	59.890	60 008	000	2000	700.60	59.384	59.002	57,137	52 618	45 546	40.010	37.519	16.253	-0.853	-	7	>	,	1	×
			10	0	_	6		D 0	p (50	3	_	·	0	0	4	80	-	-	×	=	,	4	Ľ
9,89	65.48	63.58	61.15	59.99	59.77	58.9	08 89	0.00	30.33	56.93	56.3	54.21	49.36	42.20	46.3	34.74	14.98	-0 7812	-	22023	>	,		×
0.075	39.344	50.819	57.096	58.227	58.287	58 589	50 544	10.00	06.00	58.136	57.636	56.020	51 563	44 724	44.12	36.998	16.236	-0.877	5					
68.63	65.42	63.54	61.19	59.91	59.8	9	000	20.00	28.42	56.94	56.34	54.23	49.39	0 0	42.33	34.74	14.95	0 7 00	2	18&19	=	,		×
0.075	39.942	52.195	59.063	60.030	60.086	60 162	100	00.100	PU.22/	59.772	59.308	57,693	52 ORB	200.70	45.704	37.656	16.370	978 0	-	-	>	,	<	×
	6		1				1	1	l	8	_	2	6	١,	4	=	5	2 5	7	×	-	ļ,	<	×
68.35	65.49	63.59	60.94	59.97	59 55	a,	5	78.87	98.19	56.98	56.11	54.02			42.24	34.61	14 95	ľ	-	16&17	>		K	×
0.144	39.805	51,266	57 824	58.873	58 970	50 158	00.10	59.164	59.291	58.793	58.490	56 749	27 475	32.470	45.452	37.604	16.381	000	-0.000	×			×	×
68.57	65.49	63.59	61.06	59 97	20 68	0 0 0	00.0	28.87	58.3	26.92	56.24	54 15	000	43.32	42.32	34.69	14 96	7007	-0.7807	48.15				
690.0	39.572	50 946	57 251	58.368	58 415	2 7 0	30.743	58.779	58.799	58.591	58.316	57 073	0 0	22.040	45.452	37.428	16 266	200	-0.860	_	/	1	×	×
68.57	65.43	63.54	1		50.35	0 0	20.9	58.82	58.39	56.94	56.29	54.2	1	49.34	42.36	34 72	14 05	200	-0.7882	12&13 ×	-	-	×	×
-0.069	43 629	54 808	80.265	51 040	01.013	200.10	101.10	61.107	926.09	60.274	59 963	10 424	70.127	53.512	46.362	38 101	16 624	10.021	-0.849	12	>	>	×	×
				1	1											-	- (0	2	×	ŀ	-	×	×
68.6	65 49	63 59	50.50	0.03	0.00	7.60	58.9	58.87	58.35	56.97	56 25		7.10	49.32	42.34	7 4 7			-0.7612	108.11	,	>	×	×
0000	47 214	10 705	49.70	27.75	30.134	58.50p	58.778	58.829	58,936	58 597	57 895	200	20.127	51.955	45.102	27 223	100.10	15.415	-0.850	,			×	×
68 34	86.38	3	03.40	60.95	29.80	59.56	58.9	58.77	58.18	56.89	7 2 2	2	54.02	49.2	42.23	24.6	0.4.0	14.95	-0.7702	788		>		
0000	200.00	29.092	105.10	57.948	59.304	59.419	59.883	59.880	59.840	50 503	00000	25.030	5/.12/	52.942	45 981	000	37.003	16.538	-0.858				×	
5 8 A	0.00	02.20	63.66	61.14	60.03	59.76	58.94	58.9	58 38	57.05	20.7	20.20	54.2	49.34	42.34	1	34 / 1	14.98	-0.7723	200	80	_	×	,
0300	0.000	35.242	47.245	55.091	56.116	56.548	57.024	57.028	57 079	27 464	37.134	55.504	55.376	51.201	44 384	1	36.647	16.118	-0 859		3	>	×	1
1,000	50.34	65.53	63.63	60.82	60.03	59.43	58.94	58.9	80 82	20.00	20 / 04	26	53.92	49.09	47.45	75.13	34.54	14.98	7877		18.2 ×	_	×	

																			1					
57 0275	59 8803	23,0003	30.777	01.1000	58.7495	59.1576	60.1620	58 5890	60.0077	61 4586	59 5997	20.00	00000	60.4773	61.6578	61.7386	50 236A	2000	28.80	1021 5903	output at	58.9	volts	
•		- 2	2	4	2	9	7	8	6	10	-	- 5	7	13	14	4	, u	2 5	-	×	line item	×	×	
2	()	× :	×	×	×	×	3 ×	5 ×	×	; >	()	× - (×	×	× 2.	> 2		Υ	0.854 x	×	×	×	×	Υ.
9	X 222	42.222 X	23.19b x	58.6/1	59.631	59.700	59.913	59.945 x	× 506 65	50 450	20.10	20.97	× 581.79	52.811 x	45 727	27 673	5	10.033	8 0-	×	<u> </u>	×	,	Ç
000	00.00	55.38	63.48	61.09	59.87	59.7	58.9	58 77	58 33	00.00	00.00	20.27	54.16	49.31	42 34	34.60	20.40	45.44	-0.7786	20832	>	×	,	·
0000	0.000	43.407	54.389	59.527	60.510	60.318	60.236	60 234	50 753	200	29.192	58.594	57.473	53.440	46 099	37 074	37.37	16.485	-0.874	×		. *		
	4,79	65.49	63.59	61.16	29.97	59.78	58.9	58 AB	20.00	1000	20.97	56.34	54.22	49.39	7F CA	10.75	4 / 4	14.96	-0.7905	9821	>	. ,		×
	0.075	43.211	54.720	60.370	61.531	61.351	61.759	61 730	24.24	24.000	61.022	60.447	58.796	53.994	46 488	000	38.309	16.636	-0.868	×		- >		×
	68.5	65.55	63.65	61.06	60.03	59.68	58 93	0 0 0	0.00	30.5	57.03	56.23	54.14	49.31	6.0.3	442.3	34.7	14.96	-0.7774	26.827		> ,	•	×
	0.144	42.280	54.342	60.620	61.420	61.647	61658	20.00	01.000	106.19	60.694	60.225	58.460	53.830	2000	40.054	38.299	16.692	-0.876	,			Y	×
	68.57	65.48	63.58	61.01	59.98	59 62	0 85	2.00	28.83	58.24	56.99	56.18	54.08	10.25	27.01	47.71	34.66	14.97	-0.7807	785		>	×	×
	0.145	44.224	55.034	60.056	60 810	60.459	60 477	200.47	60.477	60.747	59.673	59.710	58.143	E2 424	33.421	46.092	37.893	16.270	-0.880		× .		×	>
	68.82	65.43	63.55	61.35	59 97	50 02) c	00.0	58.83	58.58	56.94	56.49	54 39	10.54	10.64	42.52	34.86	14.94	-0.8016		33034	>	×	,
	0.000	44.690	56.684	62 383	62 840	63 064	02.00	150.50	63.050	62.895	61.983	61.550	59 629	0,0	54.613	47.227	38.796	16.729	-0 860	200	×	_	×	,
	68.46	65.49	63.59	61.04	50.07	20.00	29.00	58.9	58.87	58.29	56.97	56.21	54 11		49.29	42.28	34.67	14.95	1	00070-	30&31	>	×	
	0 000	12 331	37 847	57 075	016.15	29.600	217.69	59.779	60.537	60.417	60.372	59 078	E7 478	074.10	52.480	45.295	37.174	16 725	0.007	-0.027	×		×	
	66.03	65.38	63.48	000	00.00	58.8	58.83	58.78	57.49	56.89	56.16	54 15	20.40	32.10	47.45	40.77	33.4	14 96	1200	-0 / 354	28829	>	×	

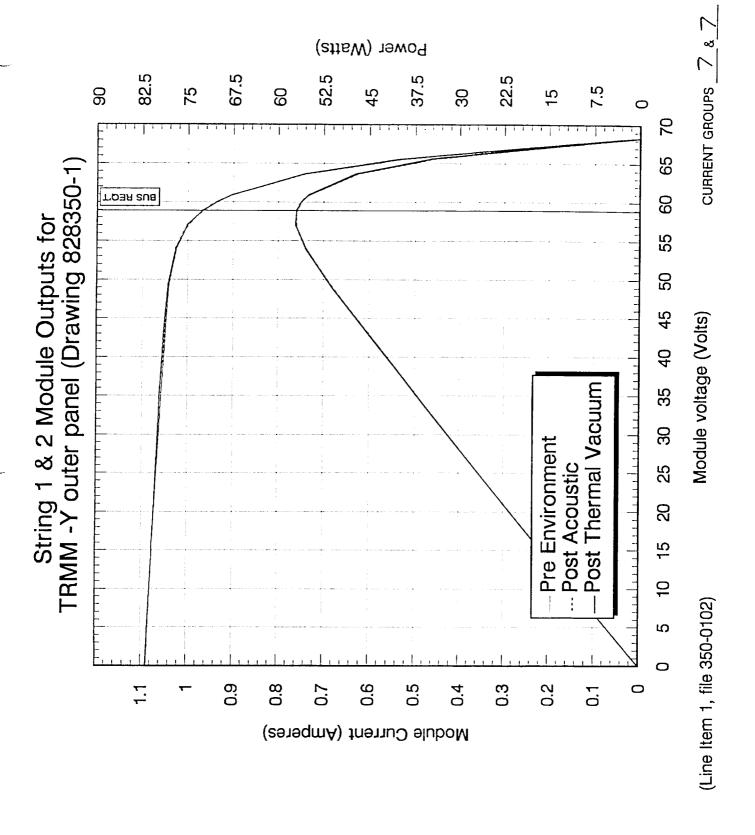
								_				_		_		_				
0.001	0.5792	0.782	0.9265	0.9537	0.958	0.9678	0.968	0.9784	0.9944	1,005	1.021	1.04	1.052	1.06	1.068	1 075	~		~	×
68.45	65.55	63.66	61.03	60.04	29.66	58.94	58.9	58.27	50.75	56.21	54.12	49.27	42.32	34.67	14.97	9.0-	24825	>	``	<u>`</u>
0	0.6211	0.8078	0.9271	0.968	0.9687	0.989	0.9919	0.9965	1.017	1.023	1.034	1.049	1.057	1.063	1.072	1.076	×		×	×
68.76	65.37	63.47	61.27	59.89	59.89	58.9	58.77	58.51	56.91	56.41	54.3	49.45	42.45	34.8	14.96	-0.8117	22823	>	,	×
0.0021	0.6271	0.8279	0.9561	0.9969	0.9953	1.016	1.019	1.024	1.041	1.045	1.054	1.063	1.07	1.077	1.086	1.093			· ·	×
68.71	65.38	63.48	61.27	59.9	59.86	58.9	58.77	58.51	56.89	56.42	54.3	49.47	42.45	34.79	14.95	-0.821	18&19	/	×	×
0.001	0.6294	0.8339	0.9647	1.002	1.006	1.023	1.024	1.032	1.047	1.052	1.059	1.068	1.074	1.08	1.088	1.094	J		×	×
99.89	65.49	63.59	61.23	59.99	59.85	58.9	58.87	58.45	22	56.38	54.29	49.41	42.41	34.76	14.98	-0.8128	16&17	\ \	Ĵ	×
0	0.5221	0.724	0.8745	0.9071	0.9196	0.932	0.9341	0.9469	0.9631	0.9724	0.9805	0.9919	1.002	1.014	1.034	1.043			×	×
68.21	65.43	63.54	60.81	59.91	59.42	58.9	58.85	58.04	56.94	55.99	53.9	49.08	42.12	34.53	14.94	-0.7942	4&15 ×	,	Ĵ	
0.0021	0.4208	0.6384	0.838	0.8535	0.8833	0.884	0.8846	0.913	0.923	0.9361	0.9461	9096.0	0.9752	0.985	1.012	1.031			×	×
8.73	65.51	63.63	60.38	59.98	59.05	58.9	58.88	57.66	57	55.6	53.51	48.69	41.83	34.3	14.97	-0.8084	12&13 ×	_		×
-0.001	0.5426	0.7513	0.9072	0.9447	0.9533	0.970	0.9716	0.9841	1.002	1.005	1.015	1.03	1.041	1.053	1.075	1.084			Ĵ	٠
68.37	65.43	63.55	61.01	59.93	59.65	58.9	58.83	58.27	56.94	56.22	54.1	49.26	42.27	34.66	14.95	-0.8062	10&11	_	×	×
0	0.6459	0.8285	0.9372	0.9831	0.9846	1.006	1.007	1.01	1.034	1.034	1.045	1.057	1.068	1.078	1.091	1.097	×		×	×
68.8	65.42	63.54	61.42	59.98	59.94	58.9	58.85	58.59	56.96	56.51	54.4	49.55	42.53	34.87	14.97	-0.8084	78.8	>	×	×
0.001	0.5053	0.7139	0.8791	0.9041	0.9216	0.931	0.933	0.9506	0.9651	0.9782	0.9886	1,002	1.016	1.027	1.041	1.054	×	_	×	×
68.18	65.42	63.54	60.7	59.91	59.35	58.9	58.82	57.96	56.94	55.89	53.82	49.01	42.07	34.48	14.94	-0.8036	5&6		×	×
0	0.4818	0.7067	0.8924	0.9165	0.9368	0.946	0.9469	0.9632	0.9716	0 9833	0.9936	1.012	1.025	1.037	1.054	1.064	×		×	×
68.02	65.49	63.58	60 68	59.97	59.32	58.9	58.87	57.93	56 97	55.86	53.78	48.92	45.04	34.47	14.95	-0.8113	+-			

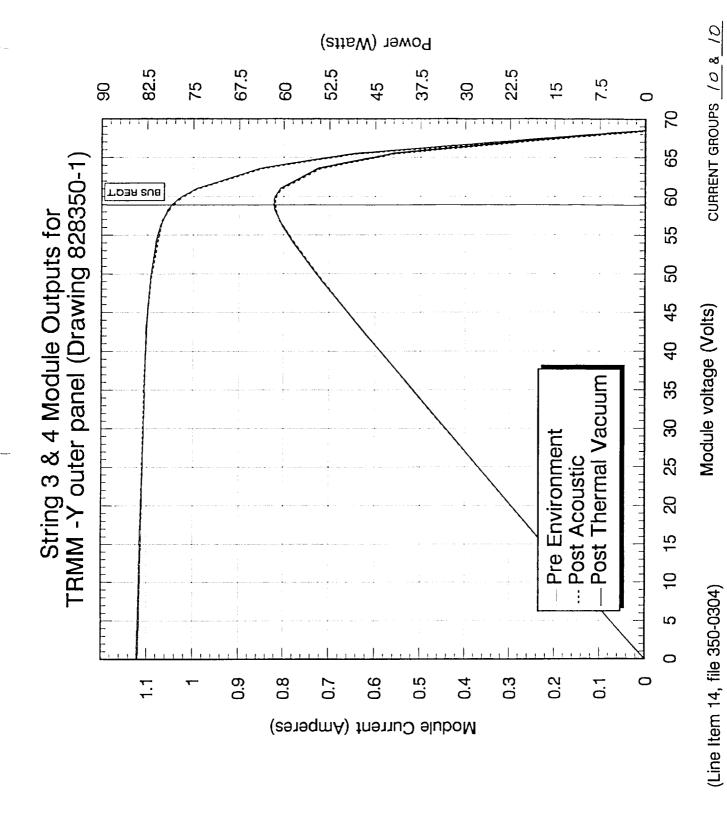
0.9462	0.9313	1.0060	0 9700	2000	\perp	6 0.9322	7 1.0234	1 0162	0 0807			1 1 0055	2 0.9664	4.006.5		14 1.0075	15 0.9289	15 0 94 15		0.303	16.4934	output at	58.9	Allov	
	.4				-	4					2	_	12			_	-			-	×	line item	×	,	•
×	0.5407 x	0 7505 x	2000	V. 202. X	0.942 x	0.9513 x	0.970 ×	V 9704 V	2 6 6 6	0.903 X	1.002 ×	1.007 ×	1 016 x		1.032 ×	1.045 x	1 059 ×	2 222	1.07 X	1.087 X	×	×	×	,	
68.21	65.5	63.6	000	68.09	59.98	59.51	58.9	20 00	0.00	28.12	56.98	56.07	53.98	20.00	49.14	42.19	34 56		14.90	-0.7969	20&32 ×	=	>		×
-0.001	0.5045	07132	200	0.8823	0.914	0.9298	0.941	7070	0.3427	0.9508	0.9766	0.9893	0 0065	2000	1.004	1.018	1 031	3	1.038	1.079	×				×
68.27	65.42	62 63	3	60.83	59.93	59.48	58.9	70 00	20.04	58.09	56.96	56.02	5203	25.35	49.09	42.15	32 45	34.00	14.96	-0.8074	9&21	>		×	×
0.001	0.4663	30000	0.0023	0.8732	0.8964	0.9195	0 9289	0000	0.9289	0.9551	0.9678	0 9812	000	0.933	1.014	1 028				1.081	×	-	_	×	×
67.9	65.47	60 67	03.37	60.46	59.97	59.09	0 82	200	28.88	57.73	56.99	55.66	200	53.58	48.76	41 88	20.10	40.40	14.96	-0.7925	268.27		>	×	×
-0 001	0.6136	9	0.8113	0.9468	0.9844	0 9892	800	200	1.008	1.015	1.033	1 030	3	1.049	1.056	1 068	200.	1.0/1	1.089	1.098	×		-	×	×
68 56	2 2	3	63.59	61.08	59.97	507		20.3	58.88	58.33	56.98	30 33	20.20	54.15	49.31	10.07	42.32	34.7	14.96	-0.8017	384		>	×	×
60.0	78087	0000	0.8126	0.9493	0 9857	0000	0.3003	1.000	1.008	1,015	1 032	1	1.034	1.044	1051		9	1.065	1.076	1.083				×	×
2 02	200.0	03.44	63.55	61.08	50 03	20.50	7.60	58.9	58.83	58.32	56 96	3	56.23	54.15	49.3	2 9	42.32	34.71	14.96	-0 8009	_	T	>	×	×
6	0	1,5,0	0.7668	0 9061	217	41.60	0.948	0.966	0.968	0 9781	2000	0.000	1.004	1.021	1 035	500.	1.045	1.051	1.0633	1 068		×	_	×	×
1:3	68.34	65.44	63.55	61 02	20 03	29.32	59.64	58.9	58.83	58 25	20.00	00.90	56.2	54.08	10.05	43.63	42.29	34.65	14 95	٩	00.0-	30&31	>	×	
	Э	0.6314	0.8249	00400	2000	0.9844	0.9892	1.005	1 006	1011	5	1.034	1.038	1 048	100	100.	1.068	1 073	1 082	900	1.000	×	_	×	
ŀ	_		L 60	+	٦.	+	.	6	눈	+	٠,	H	6	α	٠,	커	n	1	·	10	٥Ì	Ť		Т	1

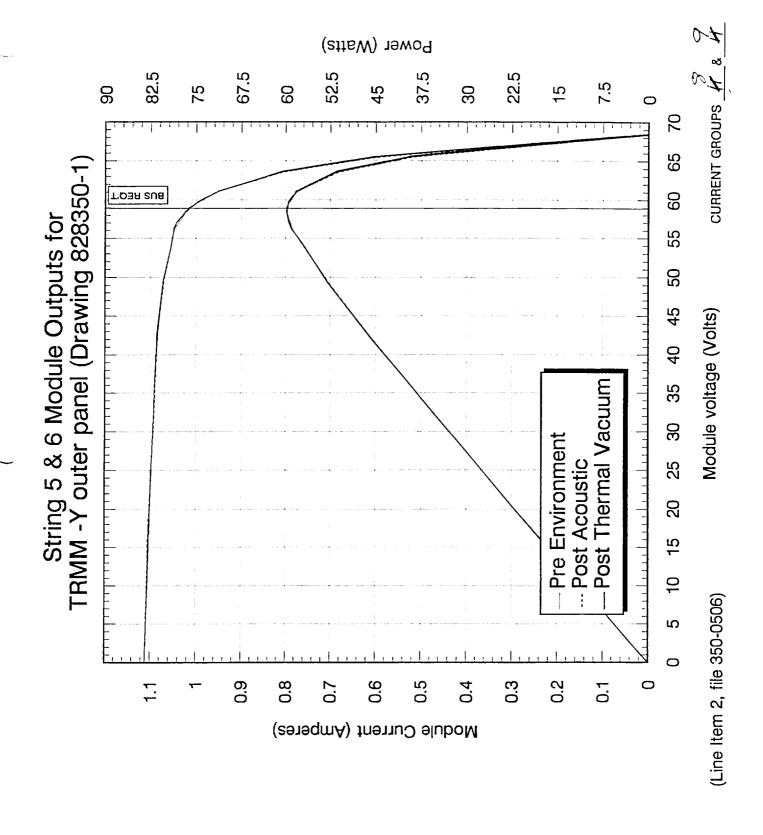
68.72 65.49 63.58 61.23 61.23 61.23 68.97 58.97 58.97 56.39 56.37 56.39 74.28 49.41 49.41 14.95 -0.8138 7.77

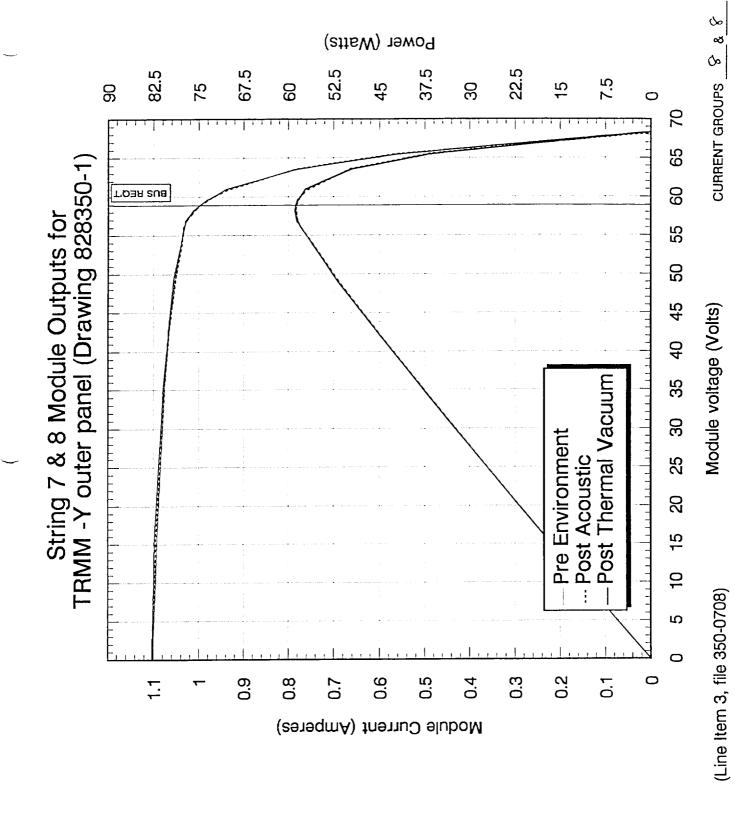
								13.00	1000	20 57	10000	GR 35	0.0011	68.63	0.0011	9.89	20.0	6/ 90	,
68.34	0.001	68.5	0	68.34	0		-0.001	70.00		00.01	200.0	65.00	0 6090	65 42	0.6014	65.48	0.6423	65.49	0.6825
65 63	0.5378	65.56	0 6039	65.38	0.5692	62.49	0.6662	65.43		64.00		2	2000	73 63	0 7000	62.58	0 8397	63.59	0 8737
00.00	200	2000	0000	E3 48	0.783	63.59	0.8619	63.54	0.8018	63.59	0.8062	63.59	0.820	40.00	0.7330	2 1		64.33	0000
63.63	0.7425	63.66	0.000	00.00	000		0.0865	61 14	0 9364	61.06	0.947	60.94	0.9692	61.19	0.9331	61.15	0.9652	01.32	0.00
60.82	0.9058	61.14	0.9478	60.95	0.939		4 048	60 03		59 97	0	59.97	1.001	59.91	0.9719	59.99	0.9989	59 96	1.026
60.03	0.9348	60.03	0.9879	59.86	0.9715		1.010	35.32	Ì	50.07		59.55	1,009	59.8	0.9747	59.77	1.002	59.94	1.024
59.43	0.9515	59.76	0.9943	59.56	0.9823	*	1.023	0.60		2000		58.9	1 021	58.9	0.995	58.9	1.019	58.9	1.043
58 94	0.9675	58.94	1.016	58.9	0.998		1.03/			20.00		4	1 022	58 82	0.9965	58.89	1.019	58.87	1.044
58.9	0.968	58.9	1.017	58.77	1.001				٦	0000			1 035	58 42	1 003	58.39	1.027	58.56	1.047
58.06	0.9831	58.38	1.025	58.18	1.013					20.2	ľ	26.00 56.08	1 049	56 94	1 021	56.99	1.042	56.98	1.066
57.04	1.002	57.05	1.043	56.89	1.03			İ	1.029			56.33	1 057	56.34	1.023	56.3	1.048	56.46	1,067
99	1.009	56.28	1.049	56.1	1.032			n					1 068	54.23	1.033	54.21	1.054	54.35	1.078
53.92	1.027	54.2	1.054	54.02	·								1 077	49.39	1.044	49.36	1.066	49.49	1.088
49.09	1.043	49.34	1.073	49.2									1 082	42.39	1.055	42.38	1.074	42.48	1.093
42.15	1.053	42.34	1.086	42.23		4							1 088	34.74	1.065	34.74	1.08	34.83	1.099
34.54	1.061	34.71	1.091	34.6									1 095	14.95	1.086	14.98	1.085	14.96	1,106
14.98	1.076	14.98	1.104	14.95					1,000			9	1 106	-0.799	1.097	-0.7812	1.092	-0.7912	1.106
-0.7877	1.09	-0.7723	1.111	-0.7702	1.103	3 -0.7612	CLLI			14945	,	16	¥		×	22&23 ×		24825	
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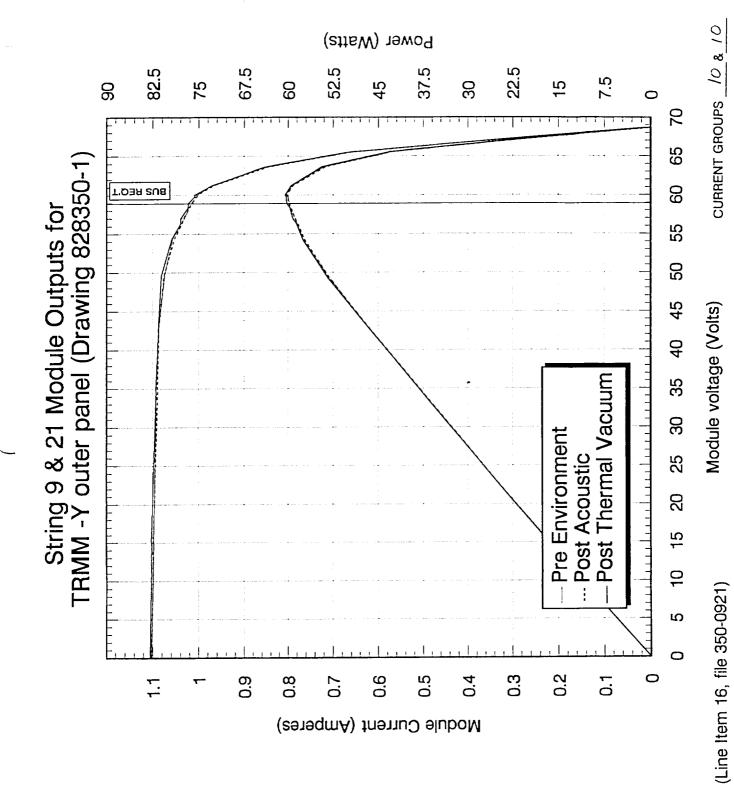
volts	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	7
58.9	×	×	×	×	v	×	J	×	×						×	1
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17.3445	×	×	×	20832	×	9&21	×	26&27	× .	3&4	× .	33&34	× -	30&31	× -	\top
1.0172	17	×	1.097 x	-0.7786	1,105	-0.7905	1.116	-0.7774	1.122	-0.7807	1.098		1.121	-0 7668	1.123	/364
1.0227	16	×	1.095 x	14.94	1.102	14.96	1.112	14.96	1.115	14.97	1.089		1.119		1.118	14.95
1.0482	15	×	1.086 x	34.69	1.093	34.74	1.104	34.7	1.105	34.66	1.087	34.86	1.119		1113	33.4
1.0468	14	×	1.08 x	42.34	1.088	42.37	1.099	42.3	1.103	42.27	1.084	42.52	1.117	42.28	1,111	40.77
1.0268	13	×	1.071 ×	49.31	1.082	49.39	1.0950	49.31	1 093	49.25	1.079	49.51	1.108	49.29	1.106	47.45
1.0705	12	×	1.056 x	54.16	1.06	54.22	1.086	54.14	1.081	54.08	1.069	54.39	1.102	54.11	1.101	52.16
1.0119	=	×	1.048 x	56.27	1.04	56.34	1.075	56.23	1.072	56.18	1.057	56.49	1.095	56.21	1.091	54.15
1.0434	10	×	1.045 x	56.89	1.039	26.92	1.07	57.03	1.065	56.99	1.048	56.94	1.088	26.92	1.075	56.16
1.0188	6	×	1.027 ×	58.33	1.023	58.41	1.052	58.31	1.056	58.24	1.037	58.58	1.079	58.29	1.062	56.89
0.9947	80	×	1.02 ×	58.77	1.023	58.88	1.048	58.9	1.047	58.89	1.028	58.83	1.071	58.87	1.053	57.49
1.0214	7	×	1.017 ×	58.9	1.023	58.9	1.048	58.93	1.047	58.9	1.027	58.9	1.070	58.9	1.017	58.78
1.0044	9	×	-	59.7	1.009	59.78	1.028	59.68	1.034	59.62	1.009	59.92	1.057	59.66	1.015	58.83
0.9974	2	×	× 966.0	59.87	1.009	59.97	1.025	60.03	1.024	59.98	1.014	59.97	1.048	59.97	1.012	58.9
1.0375	4	×	0.9604	61.09	0.9733	61.16	0.9887	61.06	0.9936	61.01	0.9789	61.35	1.022	61.04	0.9682	59.88
0.9979	3	×	0.838 x	63.48	0.8553	63.59	0.8597	63.65	0.8547	63.58	0.866	63.55	0.8914	63.59	0.5962	63.48
1.0166	2	×	0.6458	65.38	0.6628	65.49	0.6592	65.55	0.6457	65.48	0.6759	65.43	0.6824	65.49	0.1886	65.38
0.9682	-	×	×o	68.59	0	68.74	0.0011	68.5	0.0021	68.57	0.0021	68.82	0	68.46	0	66.03

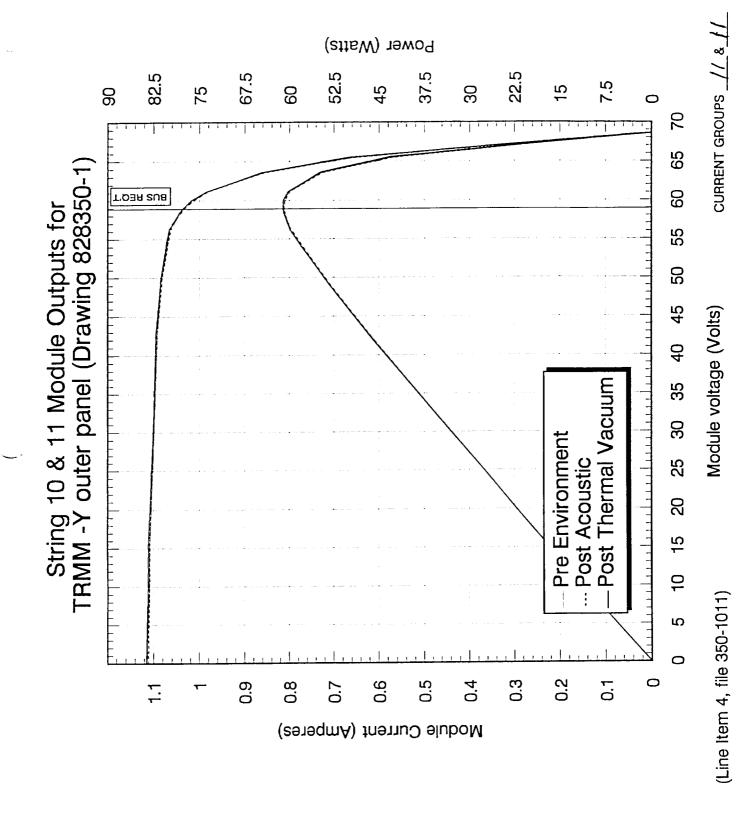


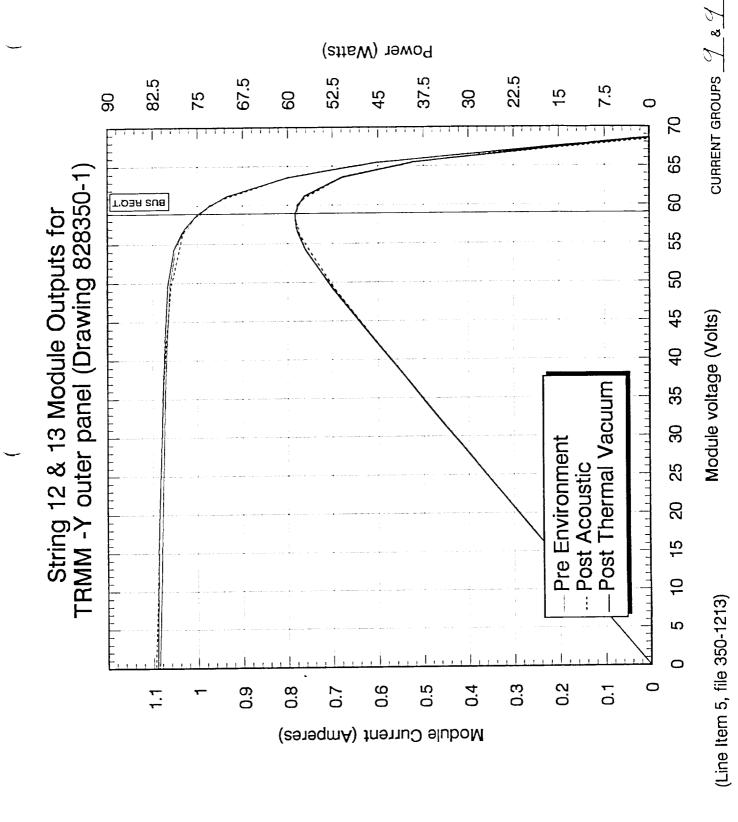


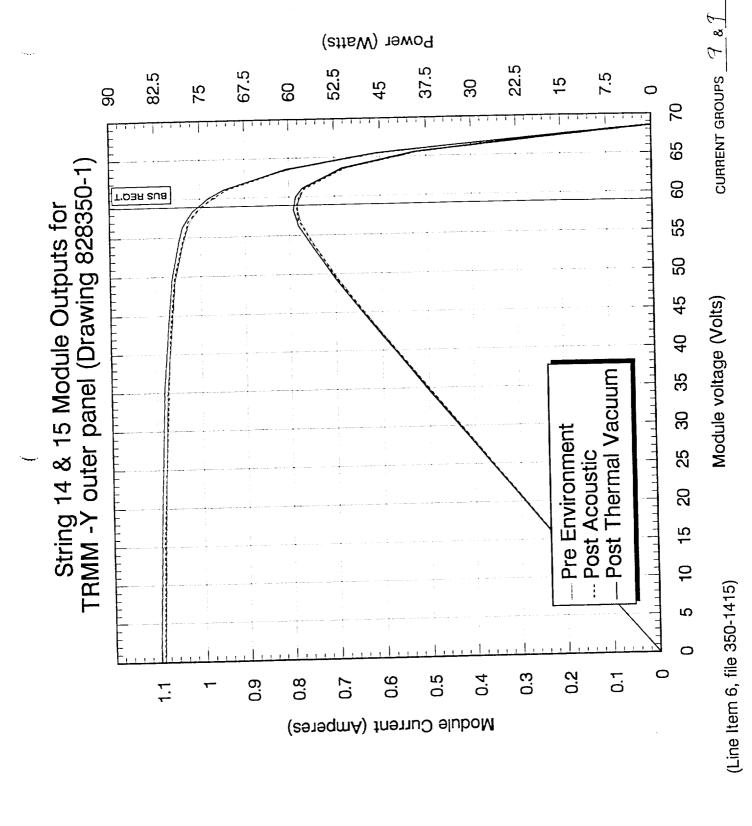


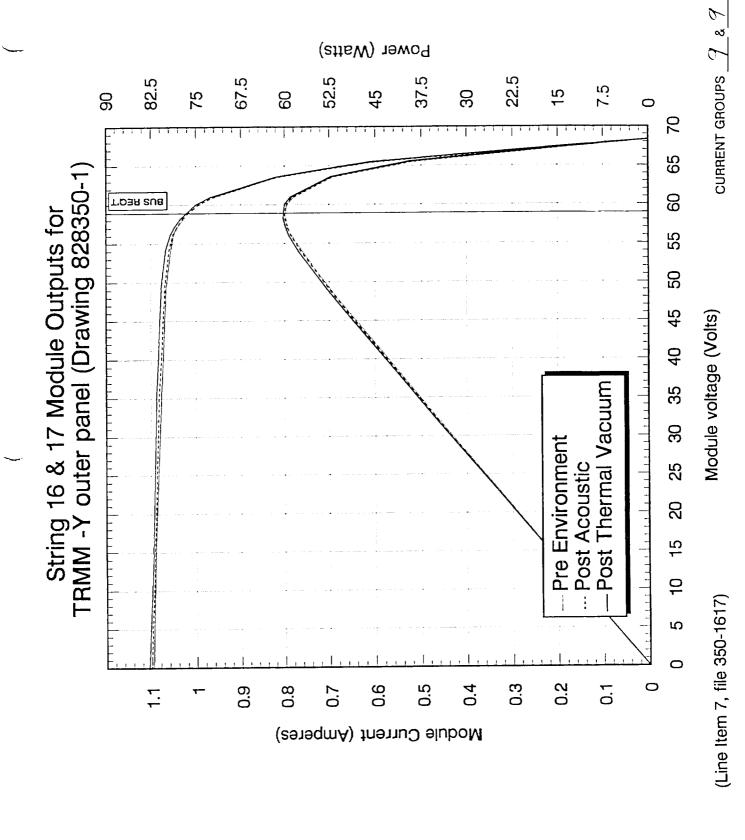


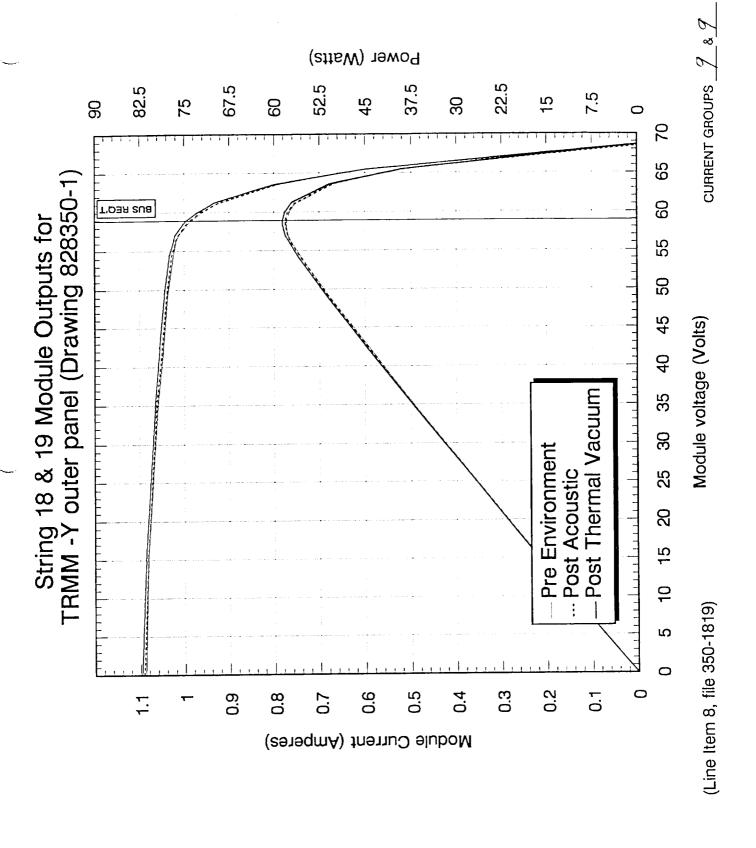


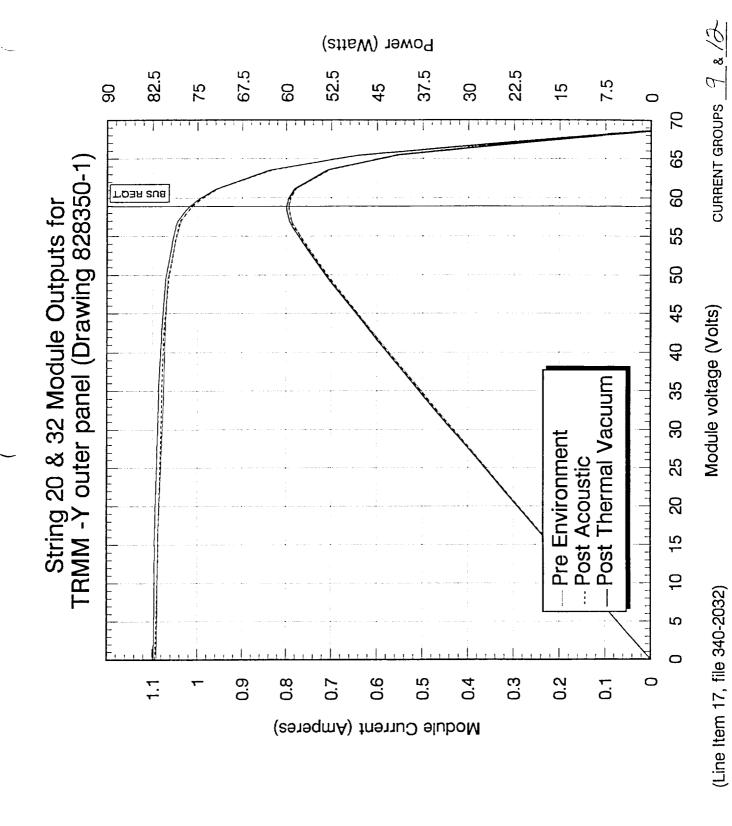


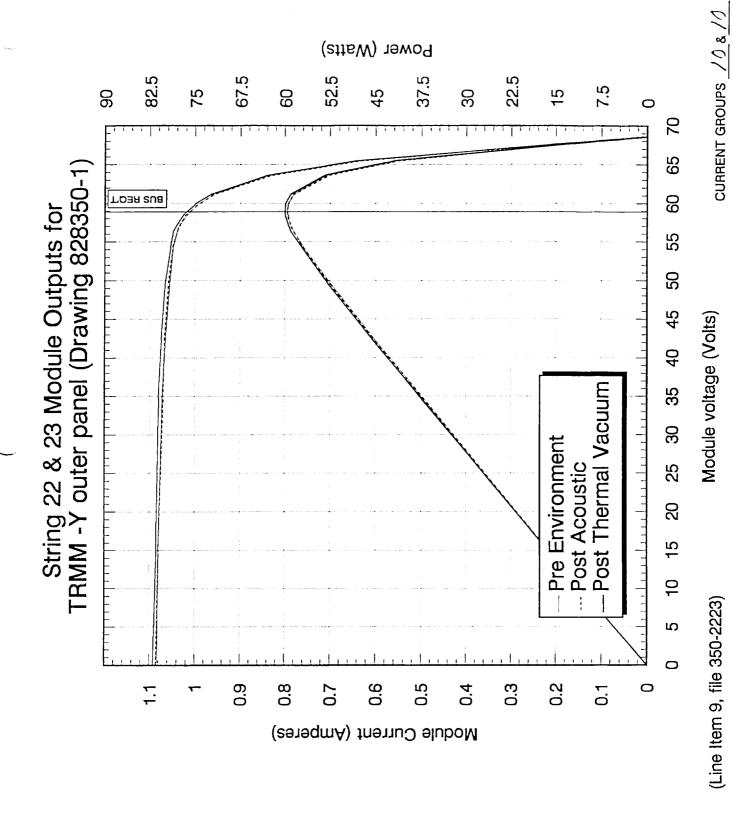


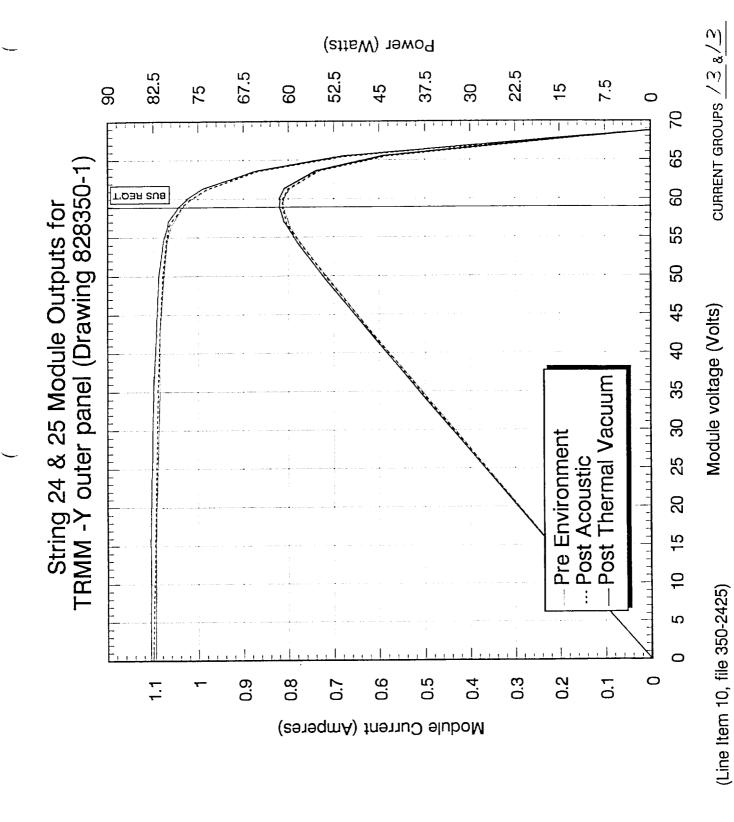


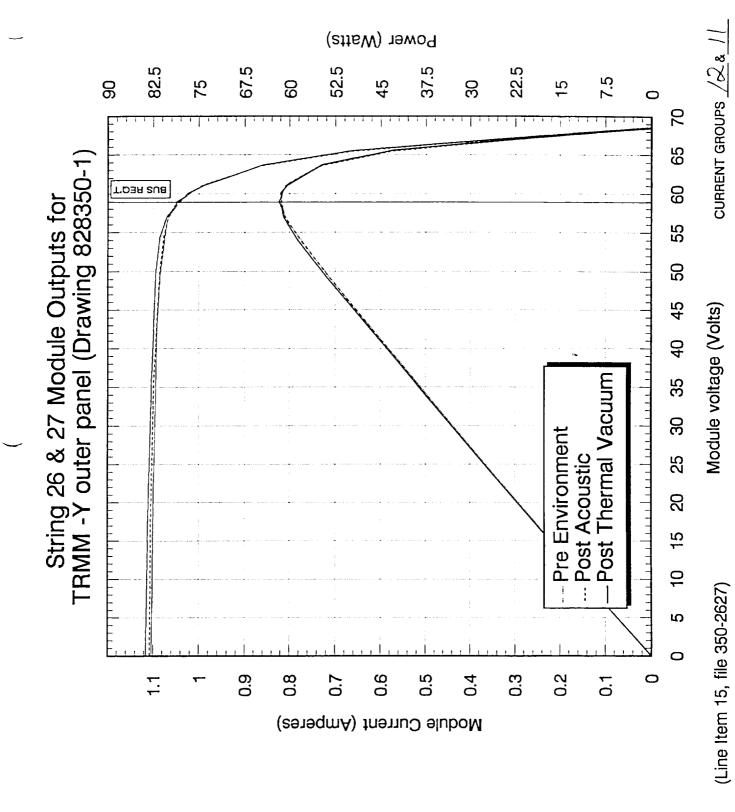


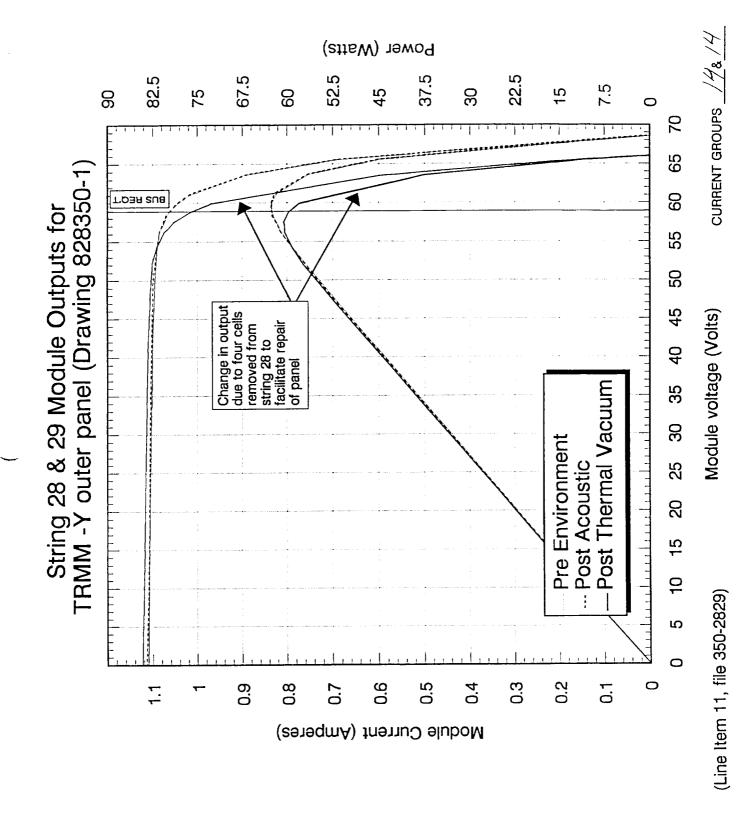


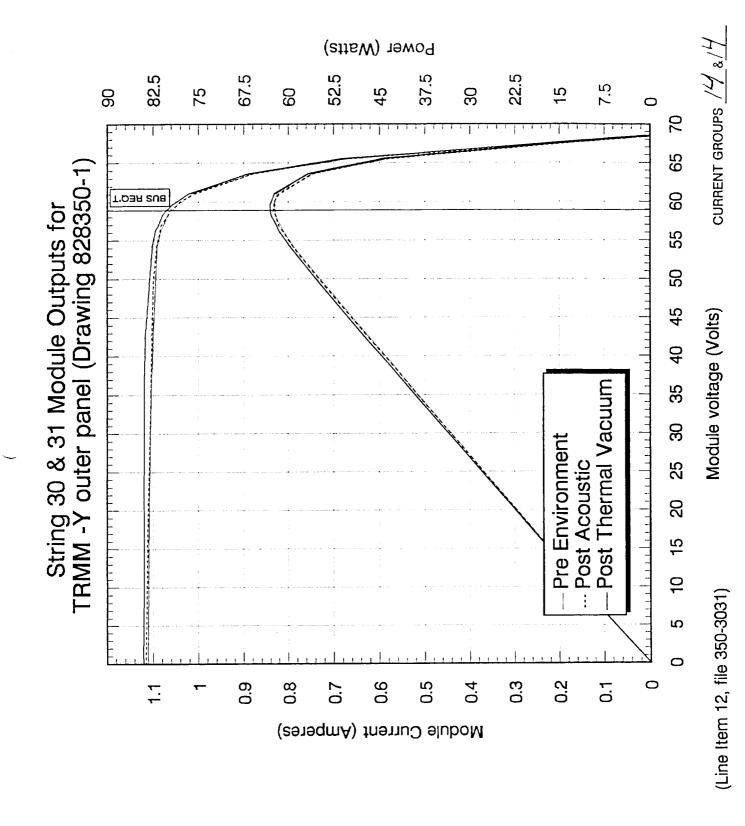


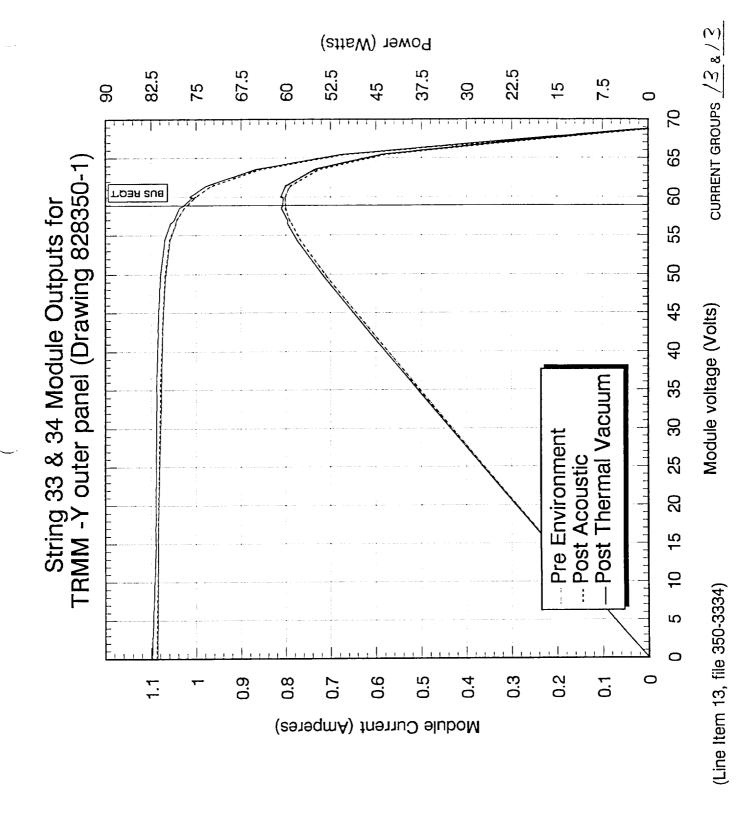


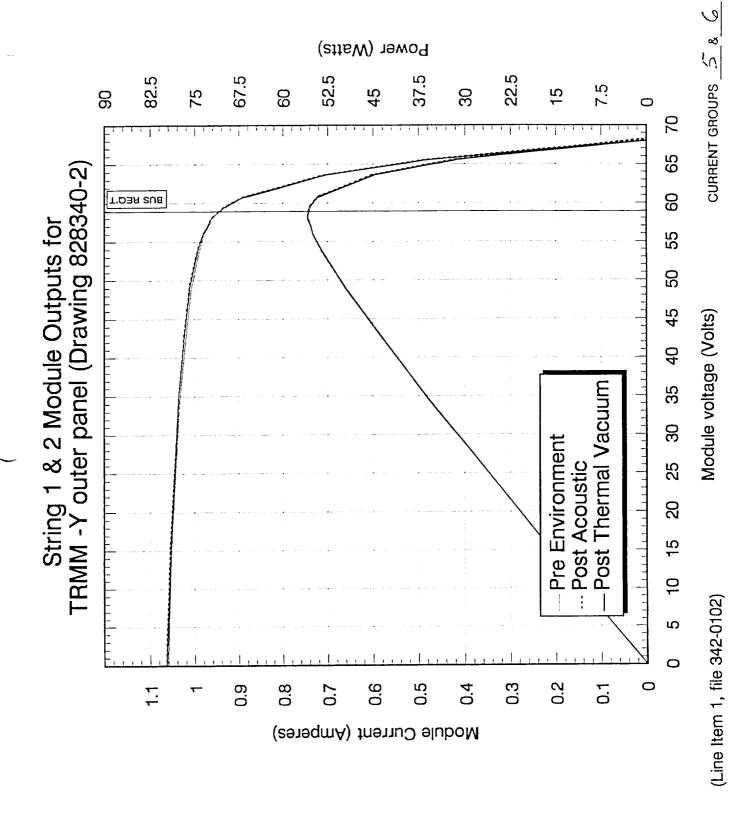


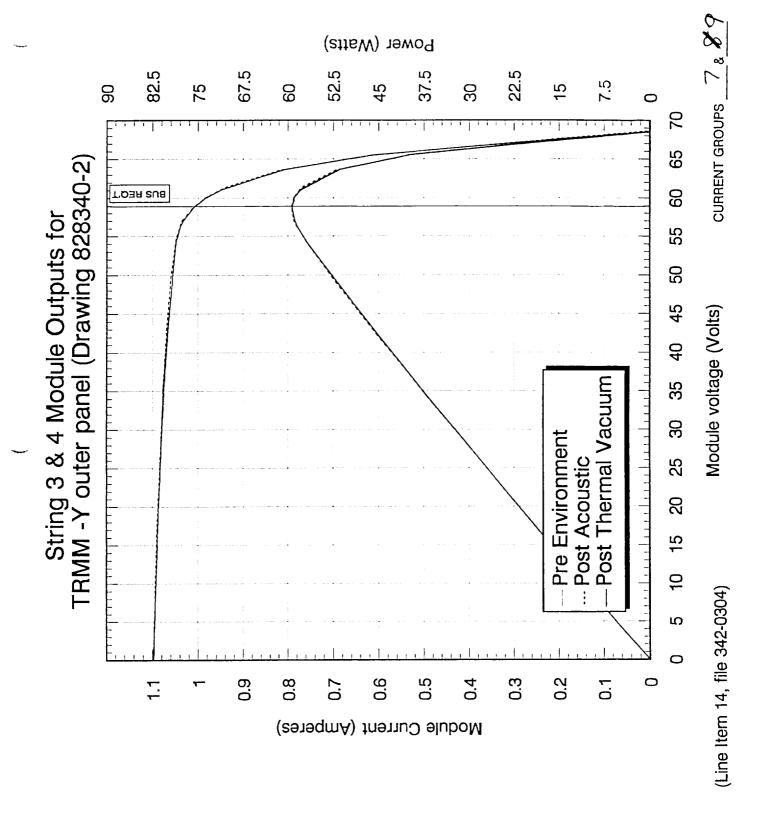


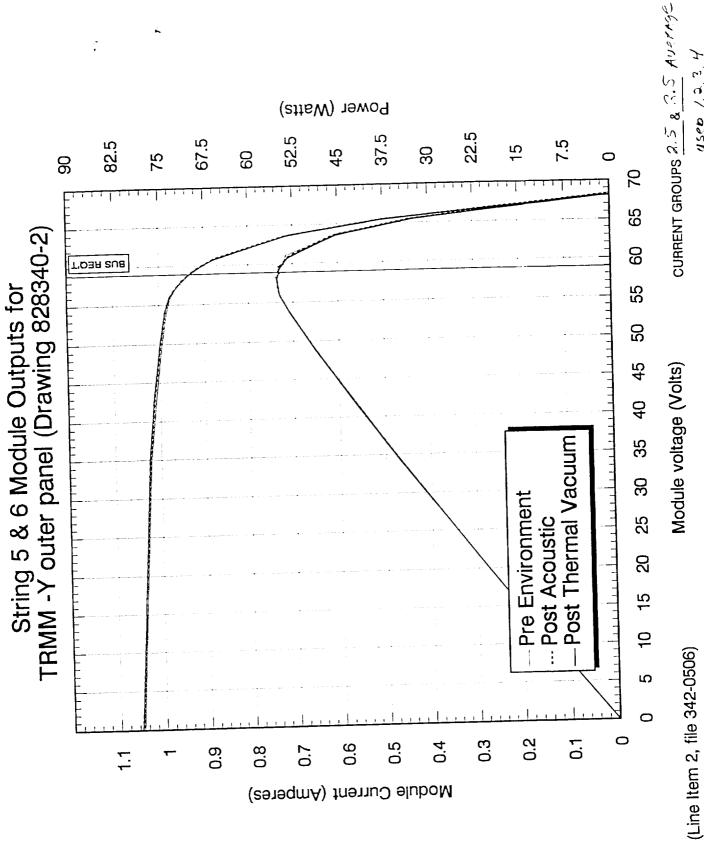




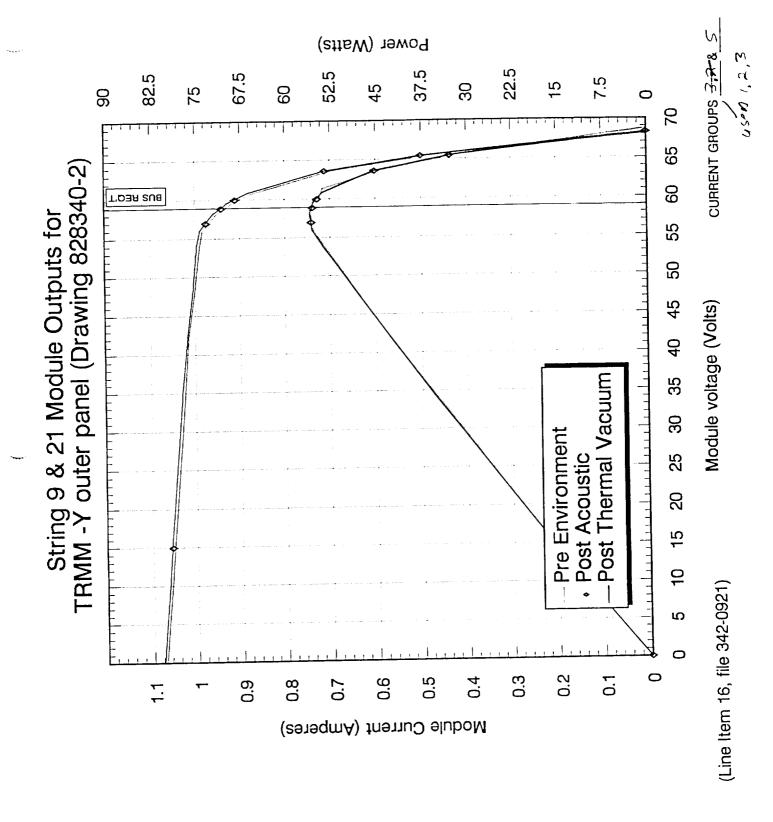


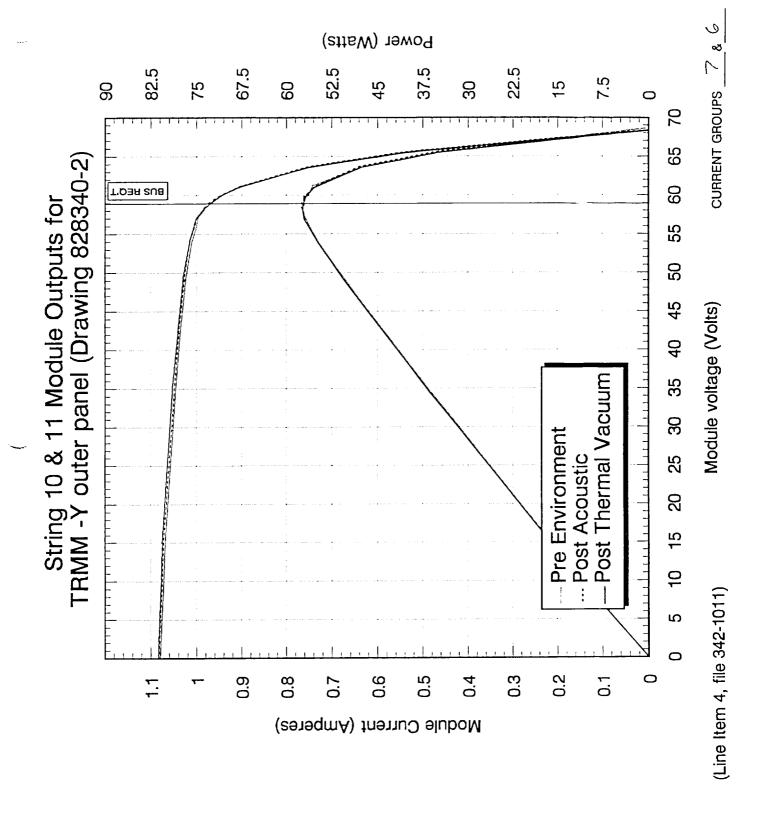


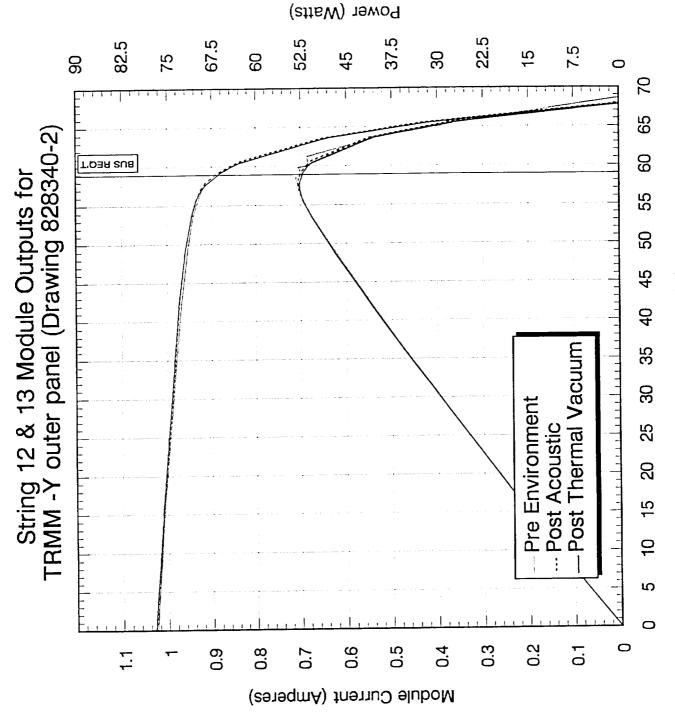




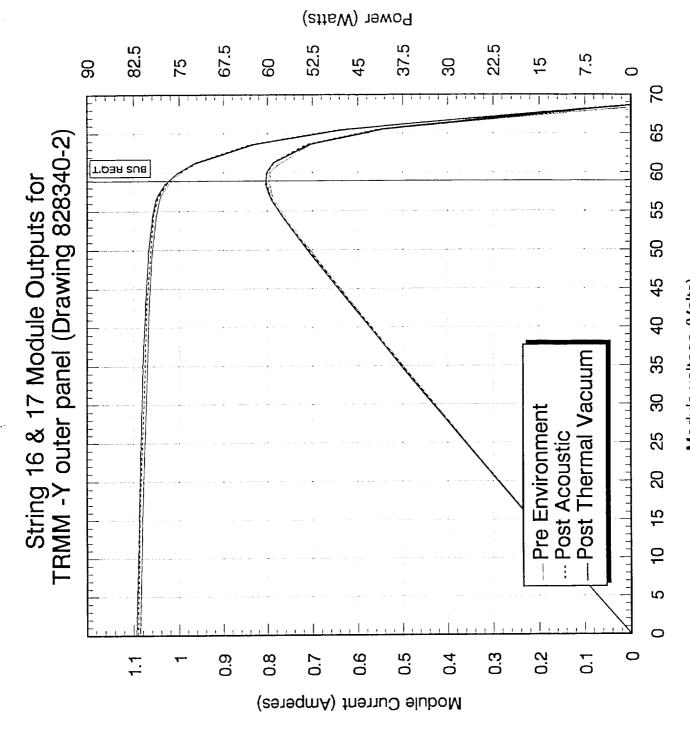
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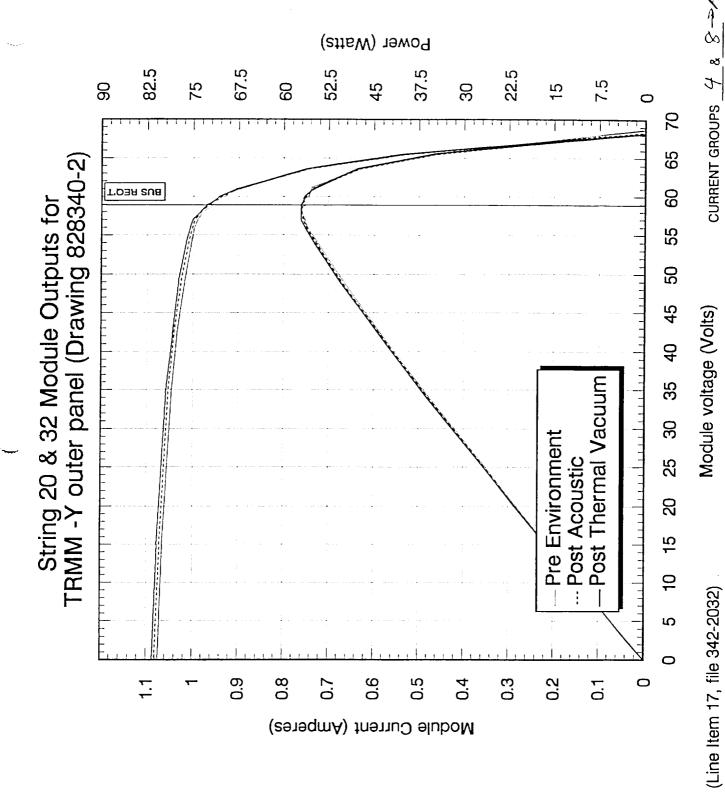


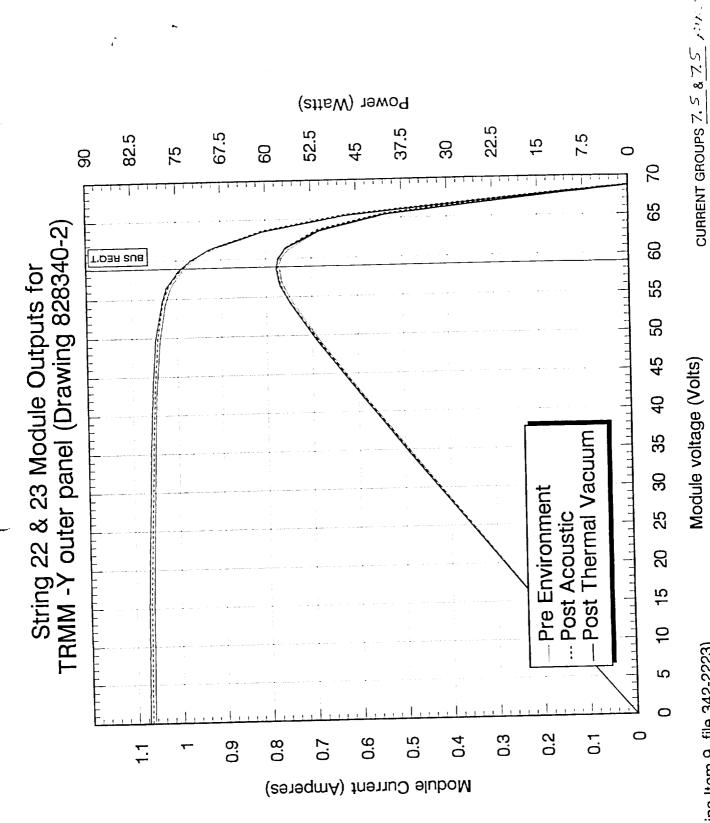




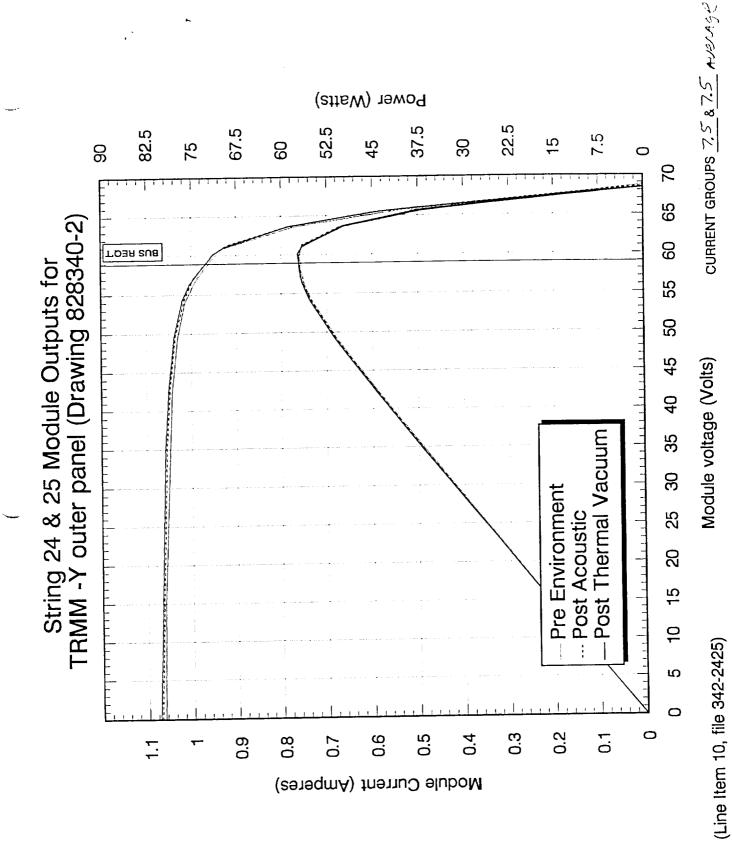
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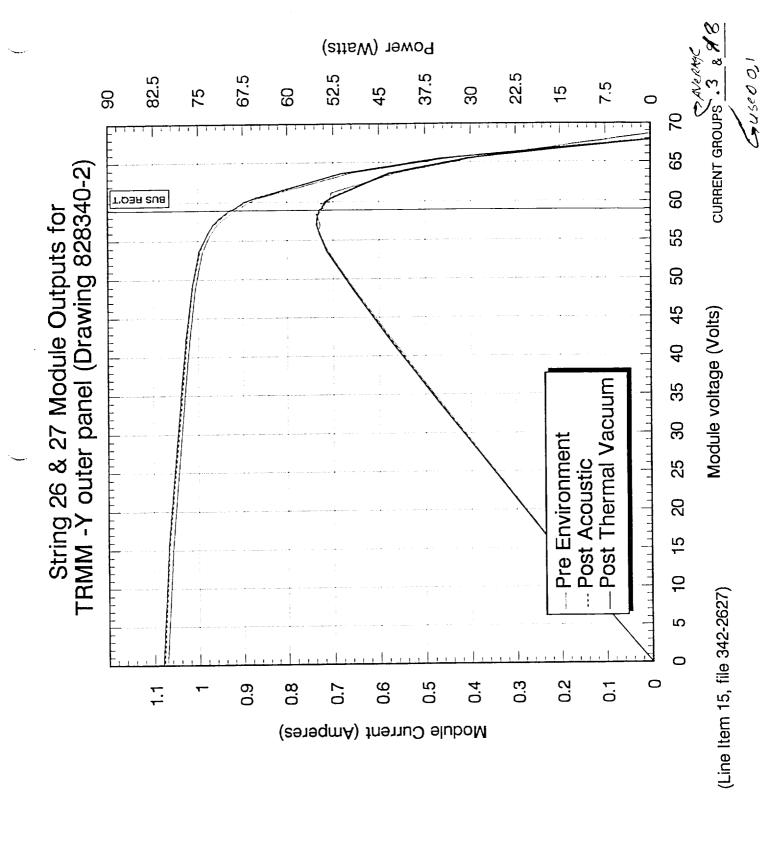


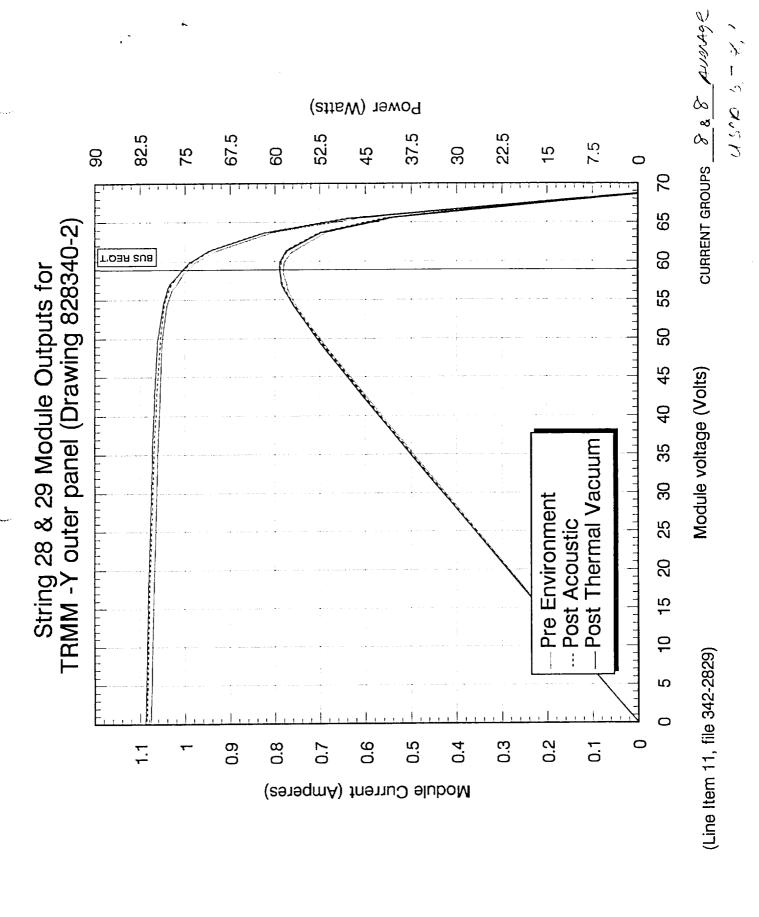


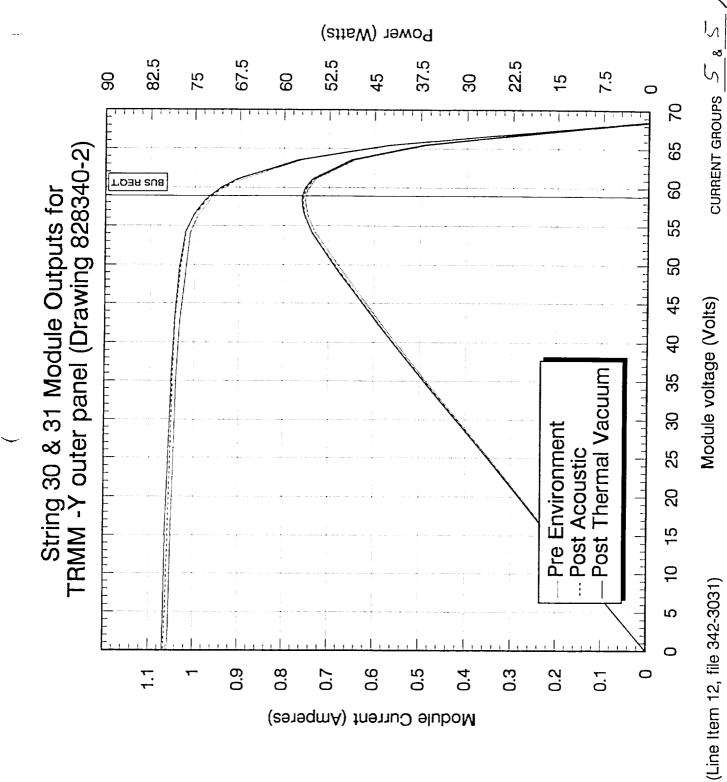


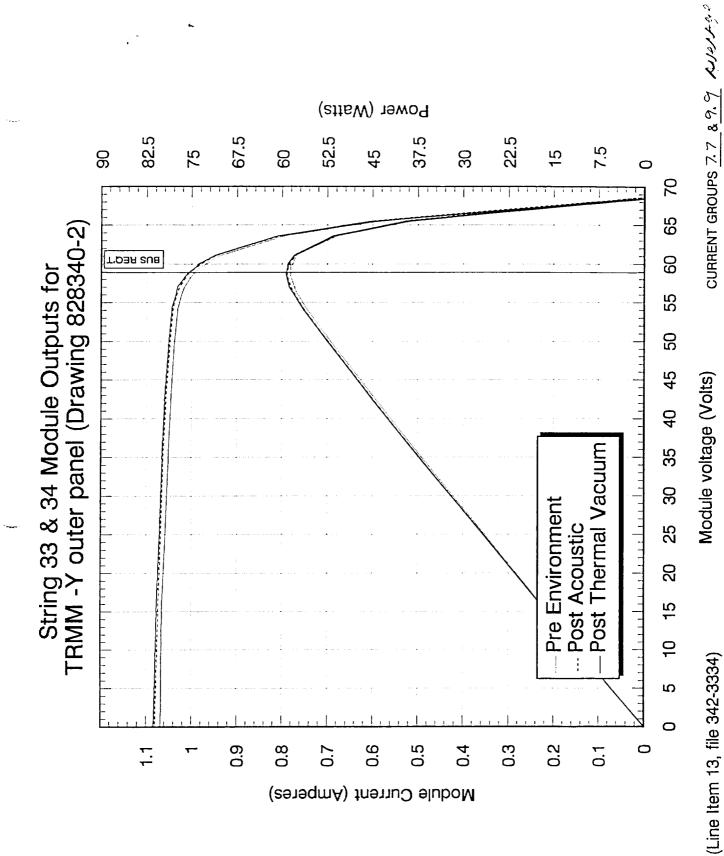
(Line Item 9, file 342-2223)

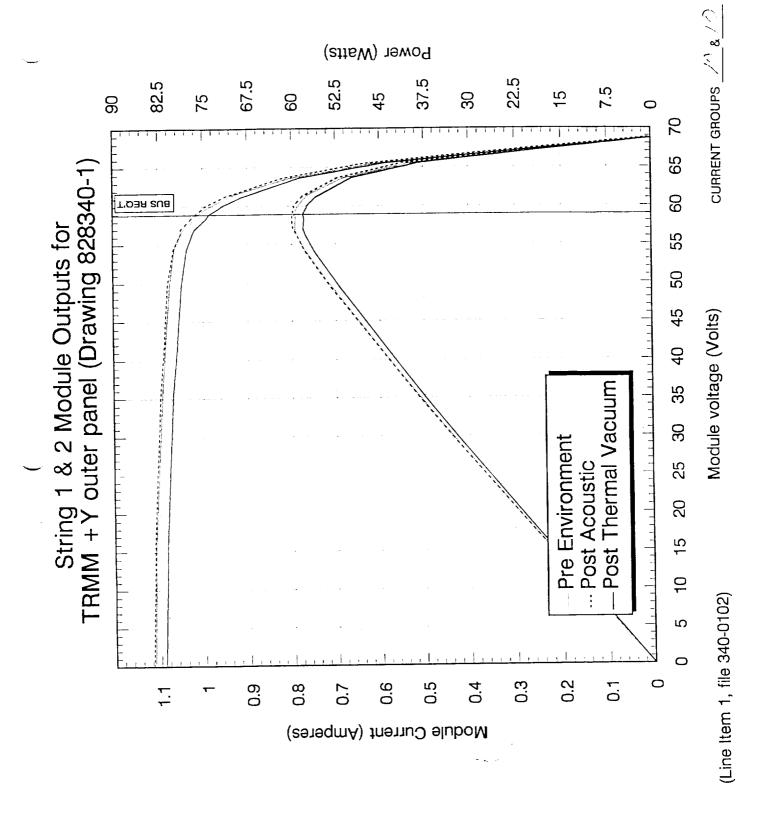


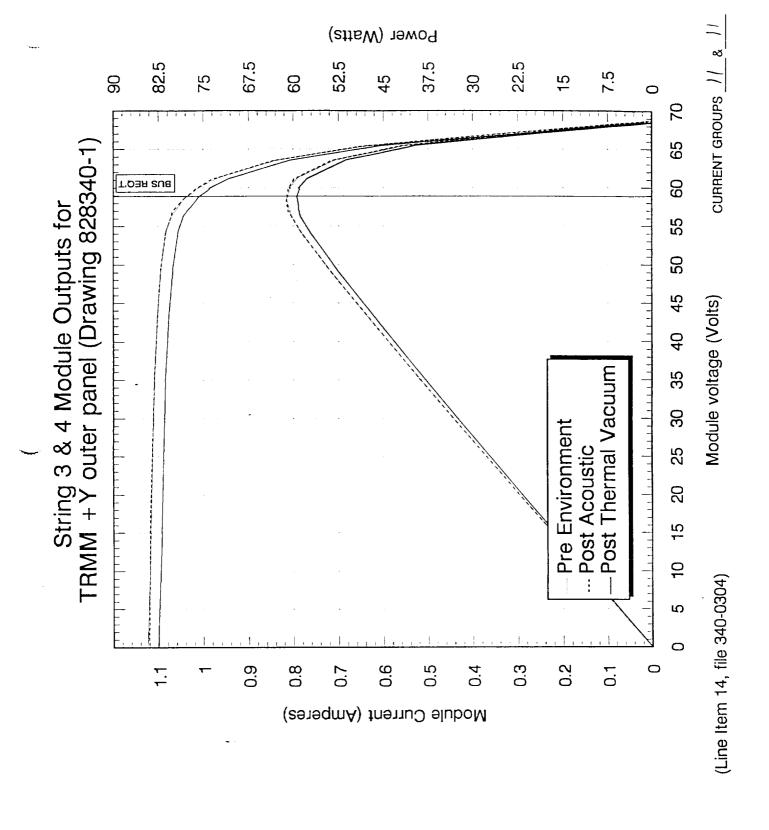


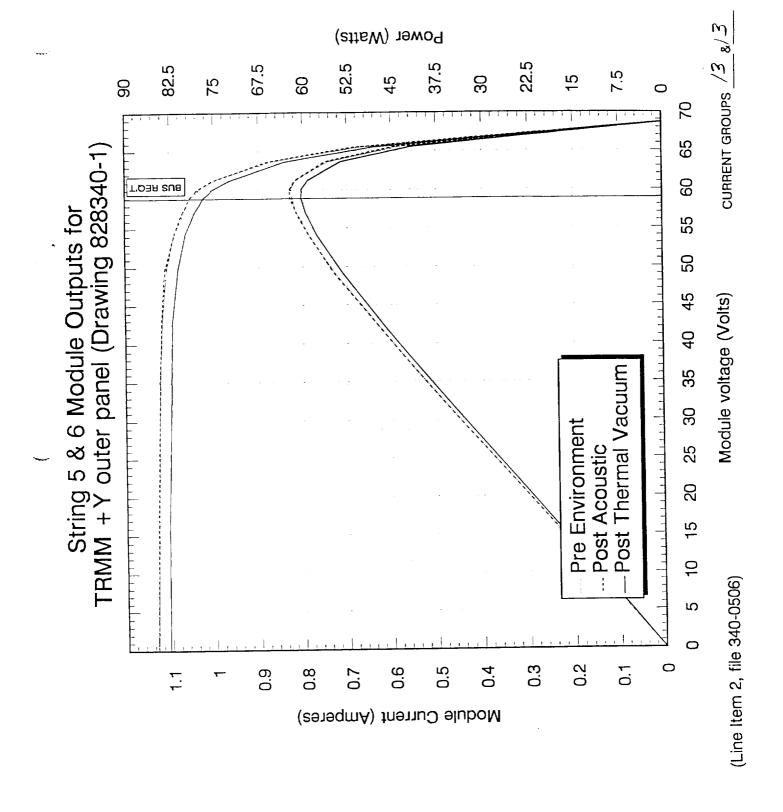


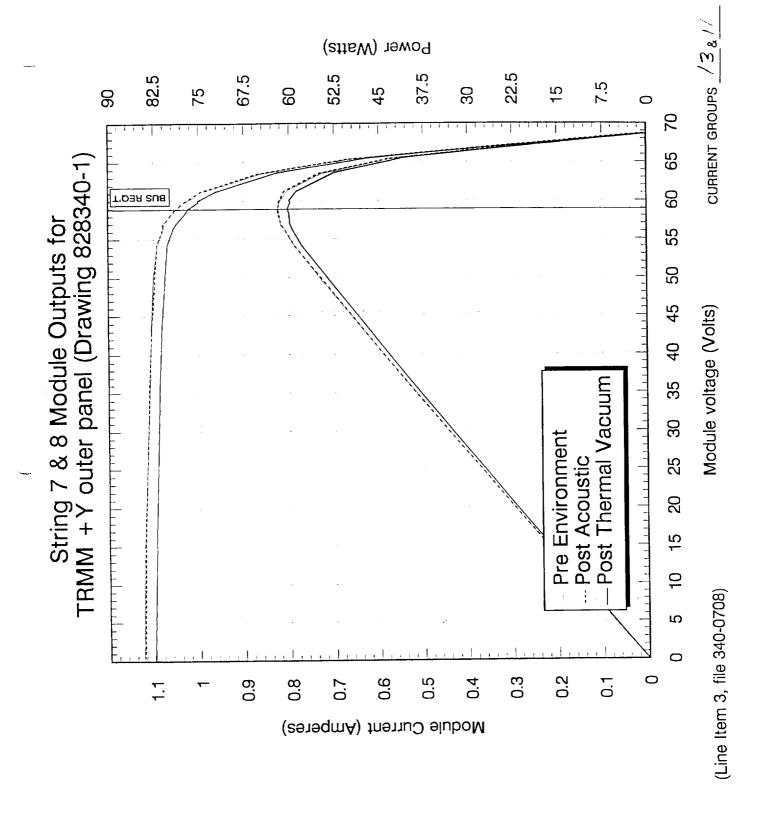


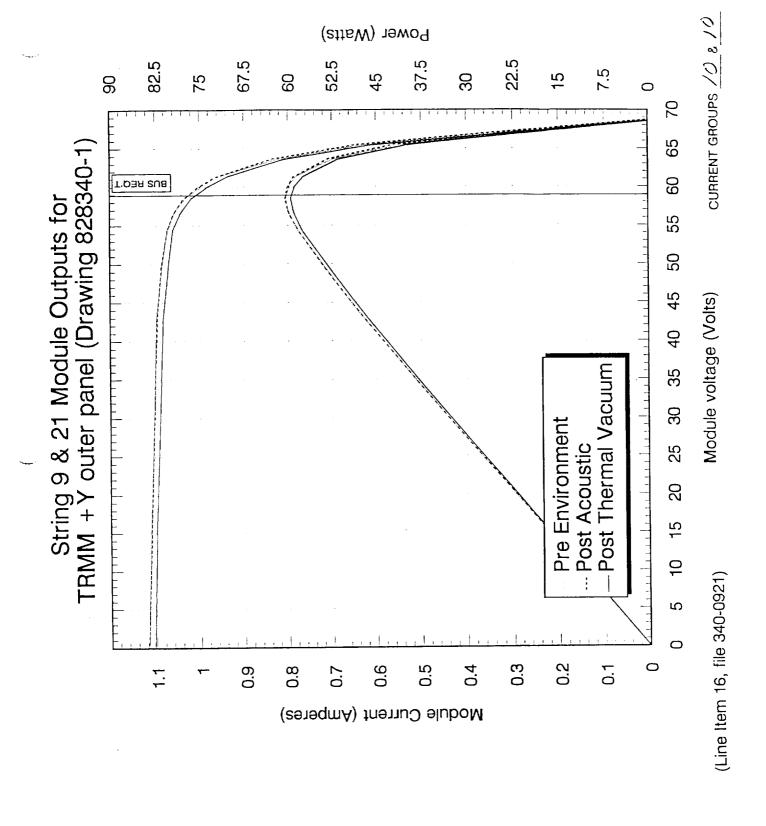


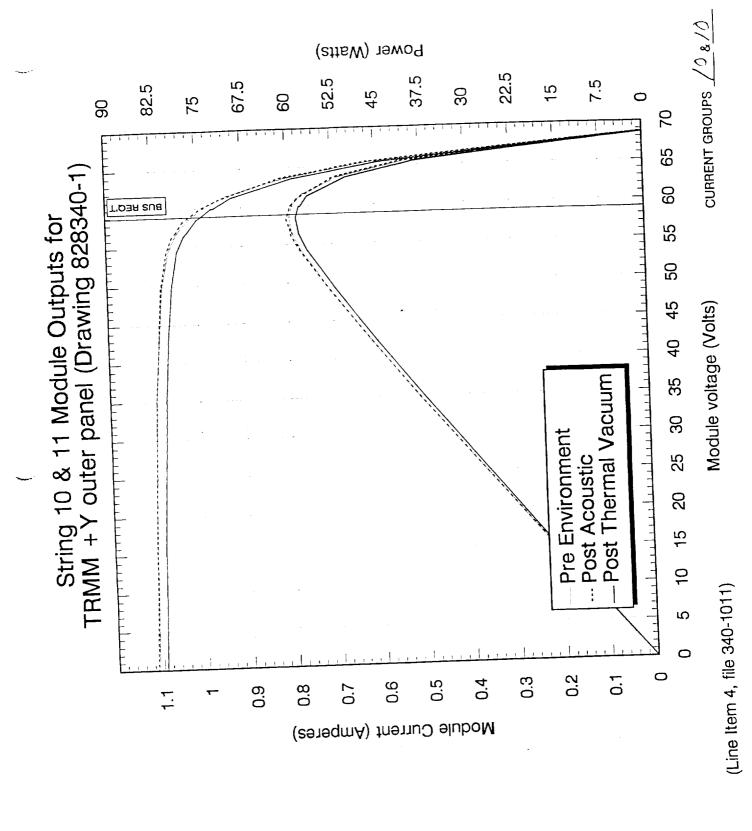


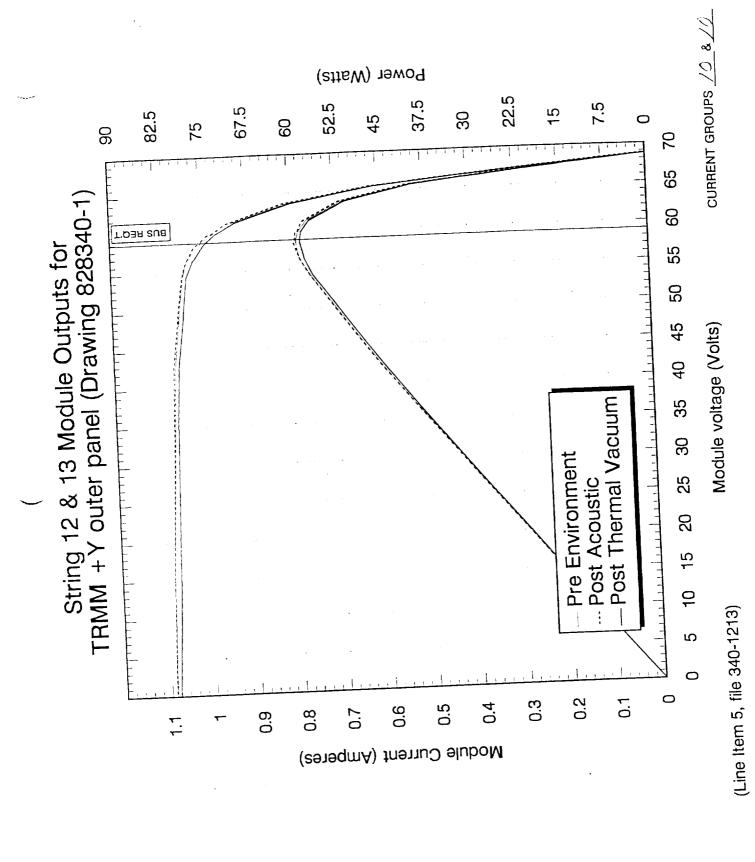


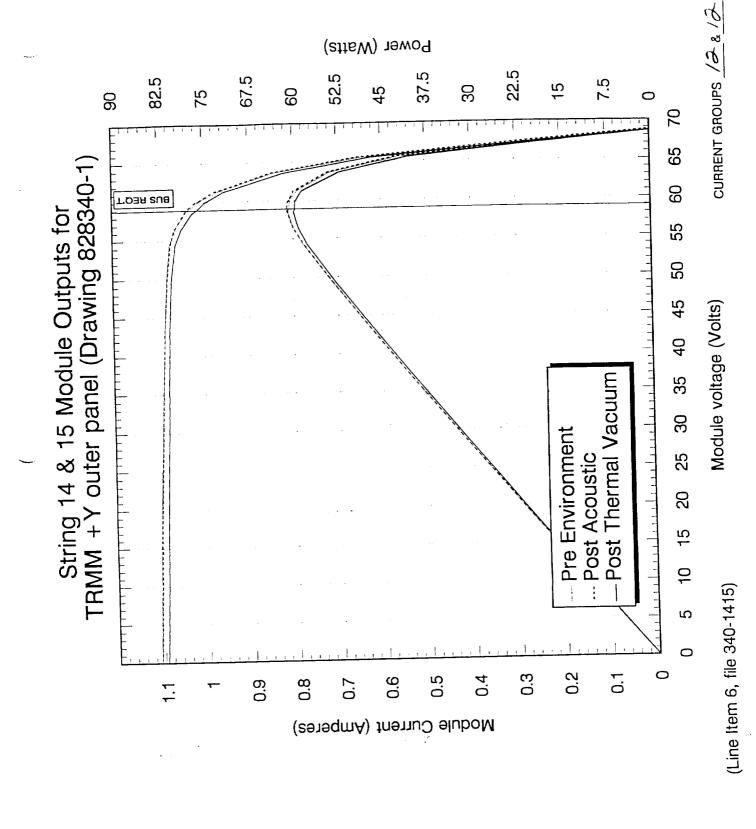


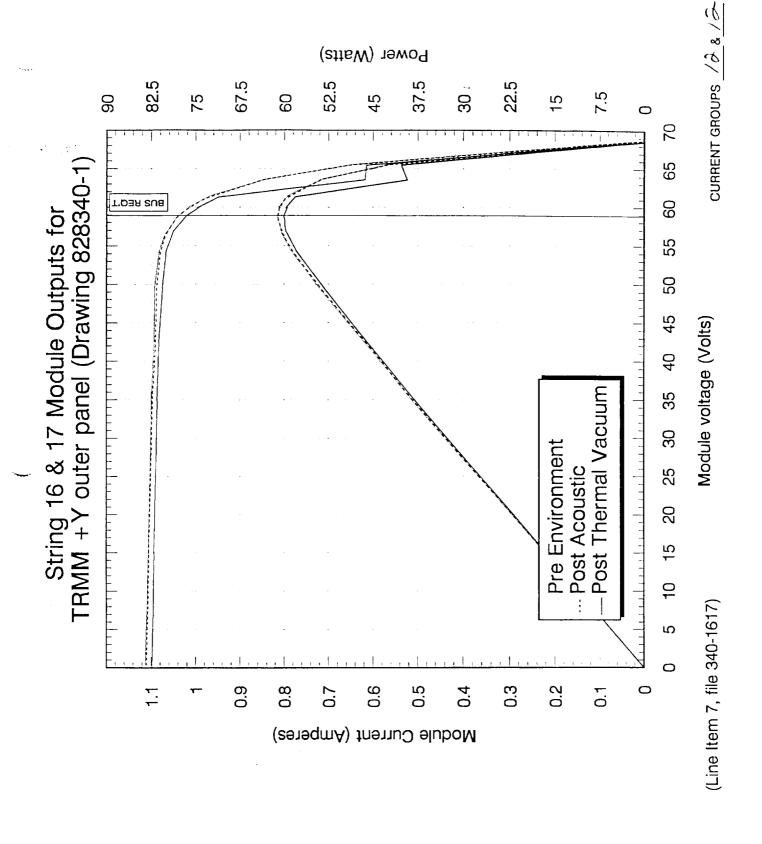


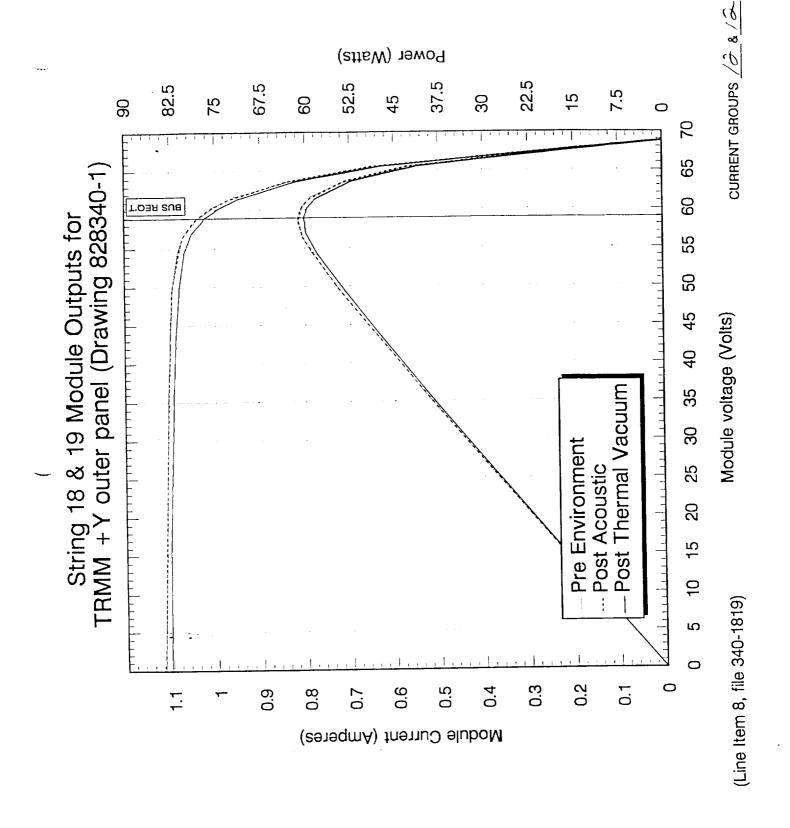


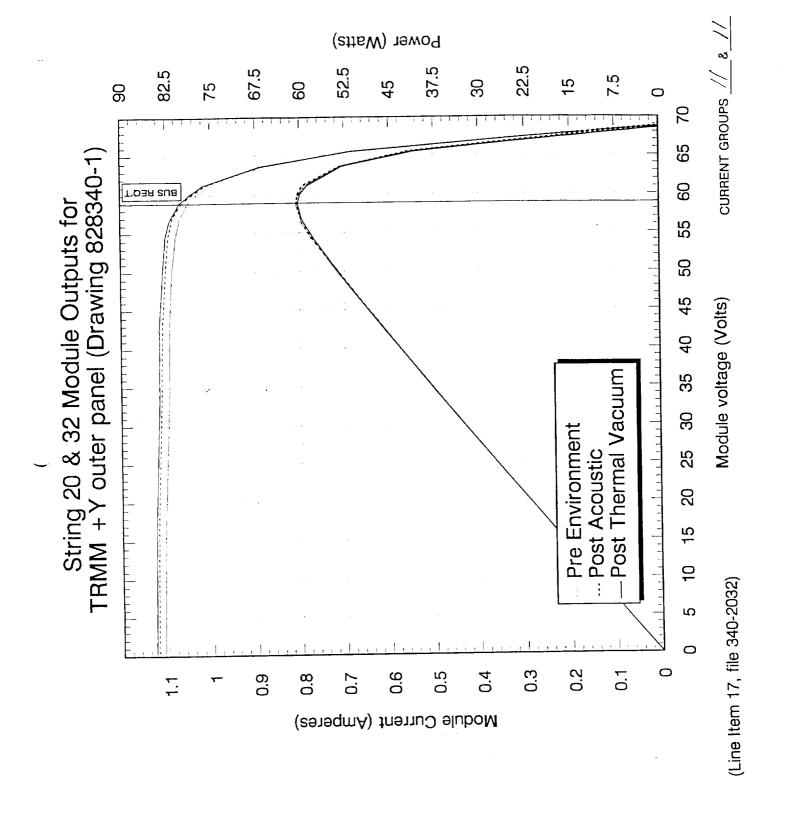


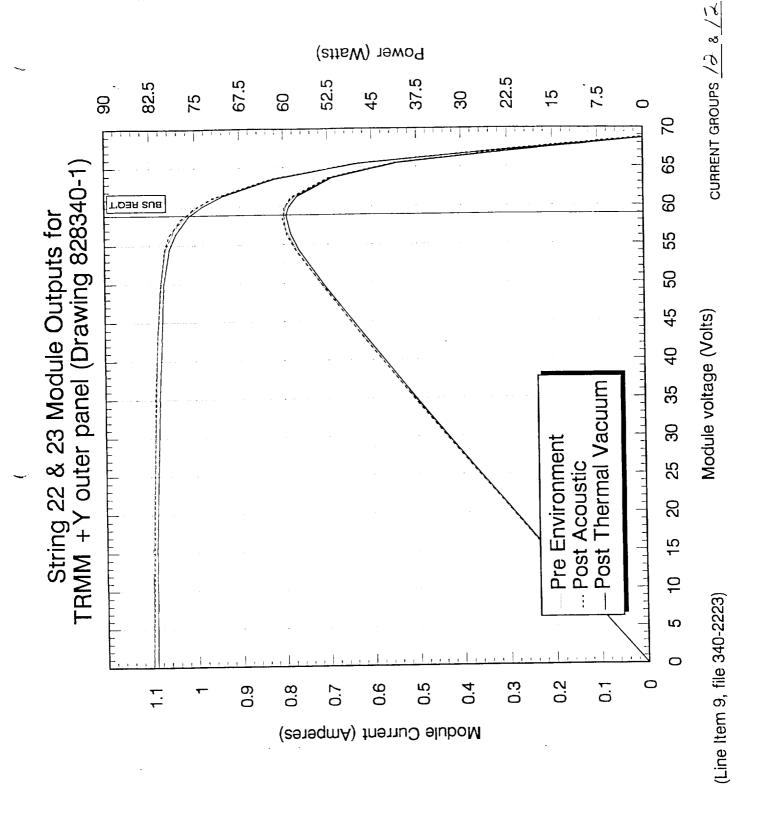


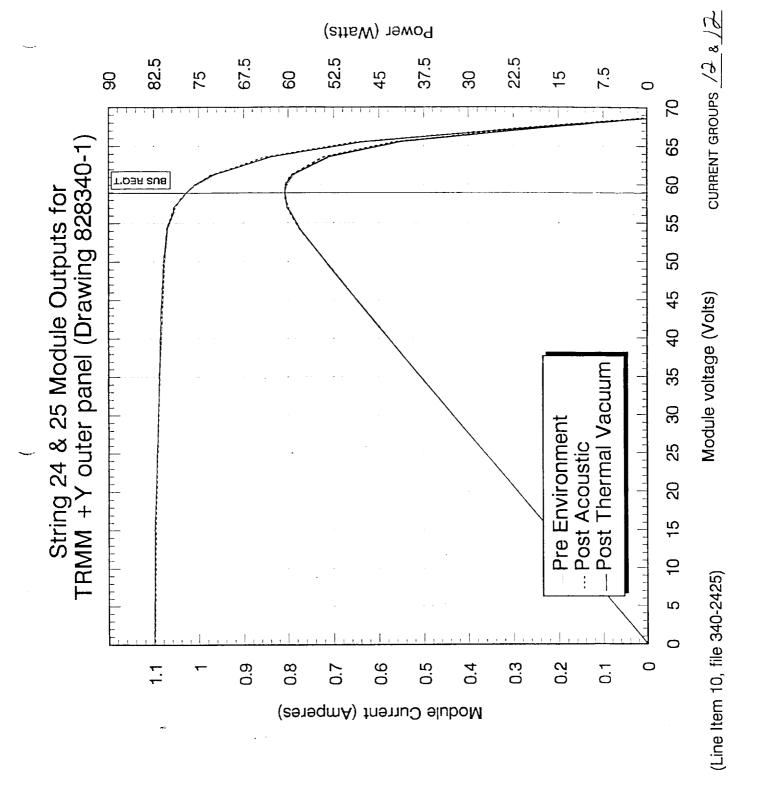


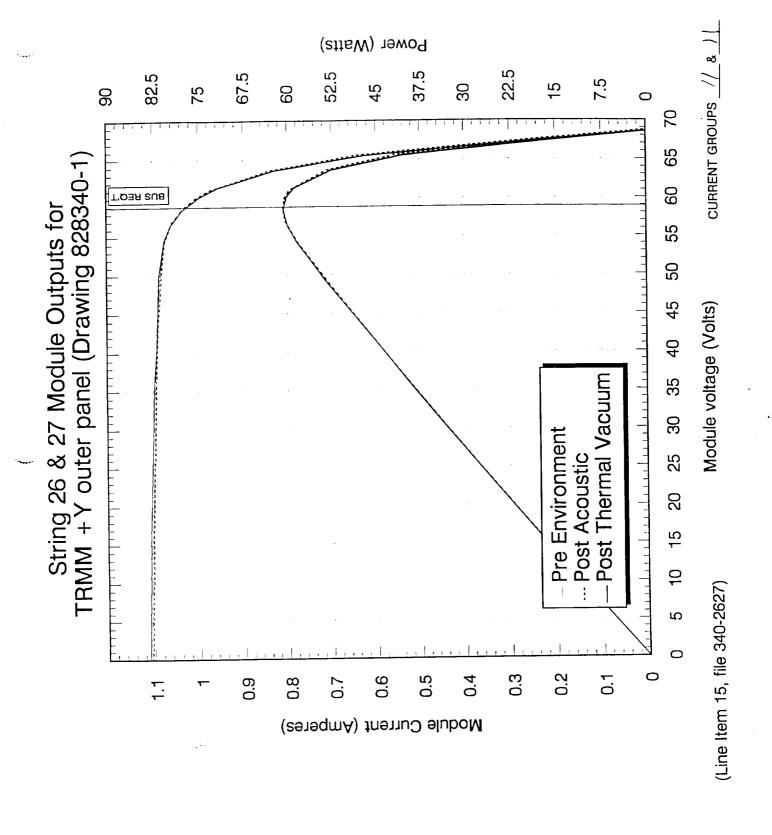


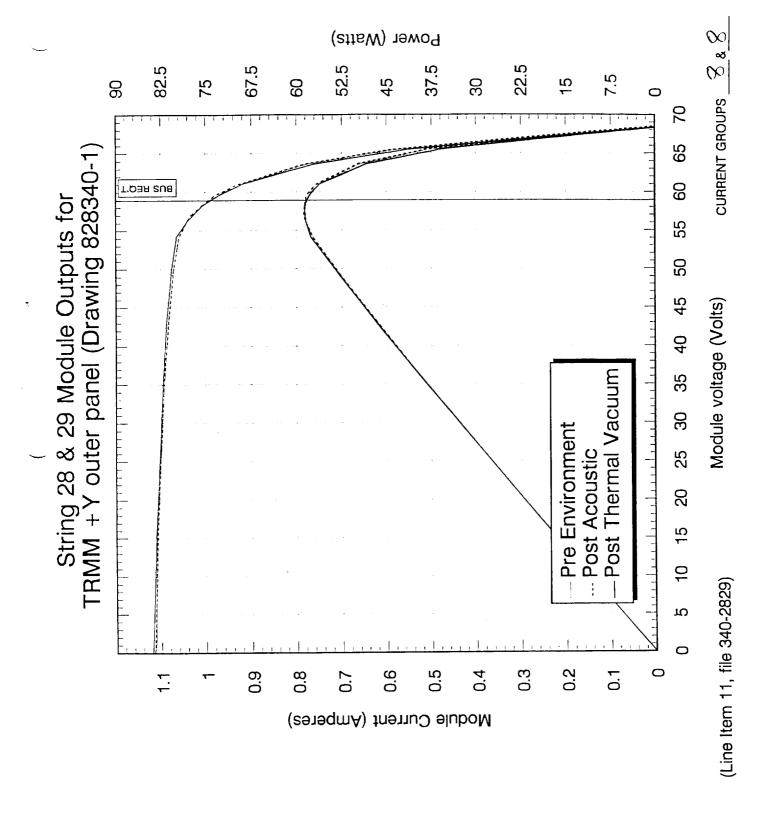


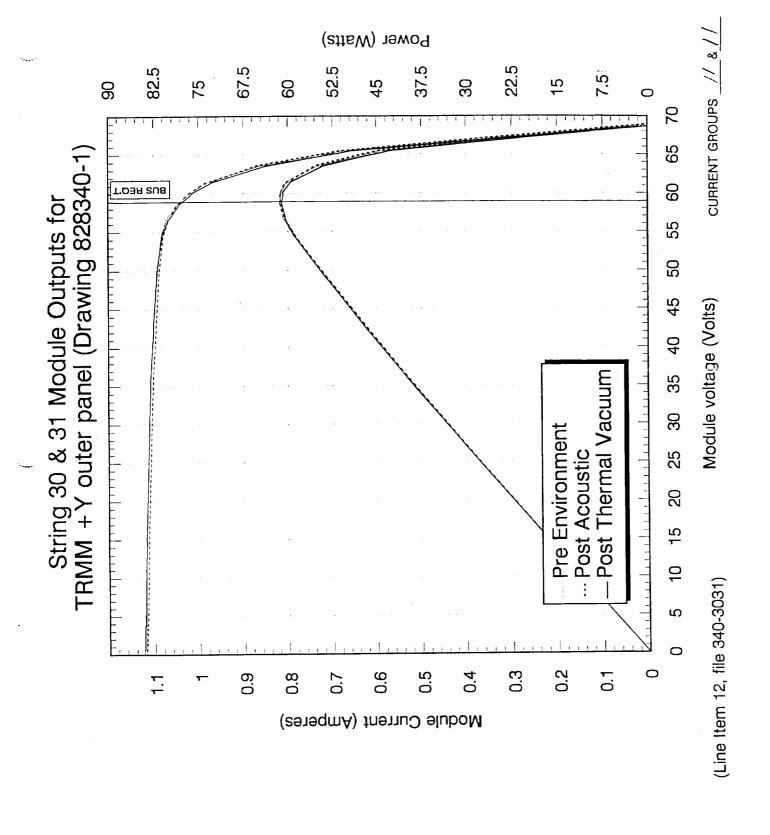


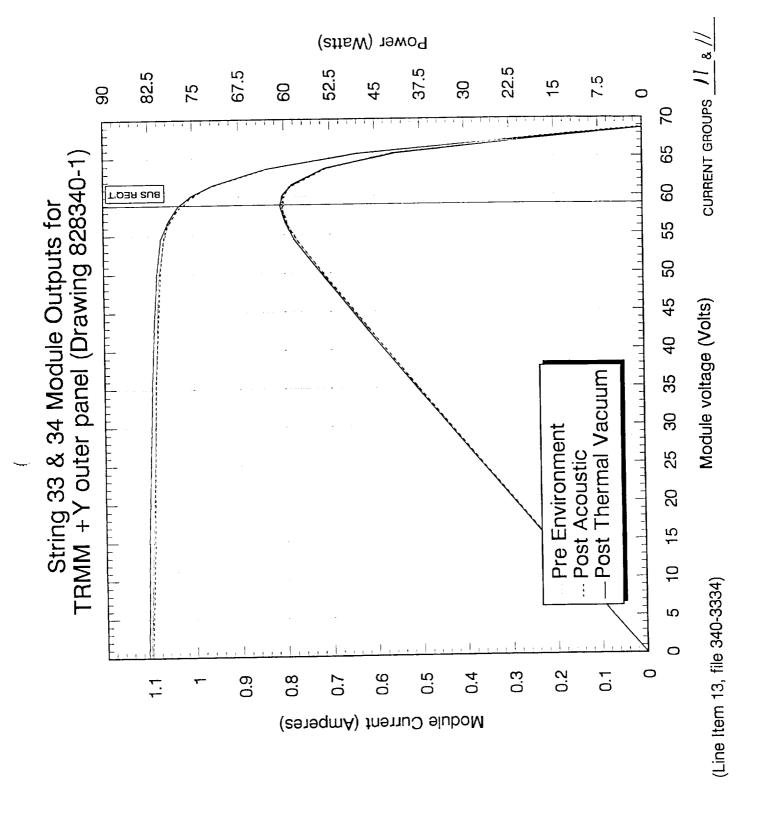


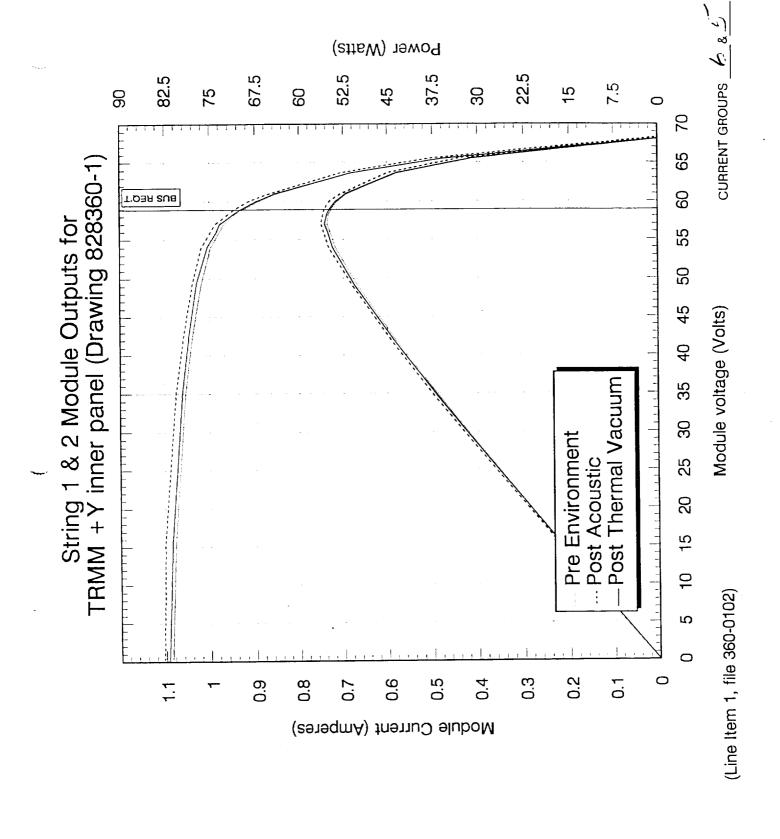


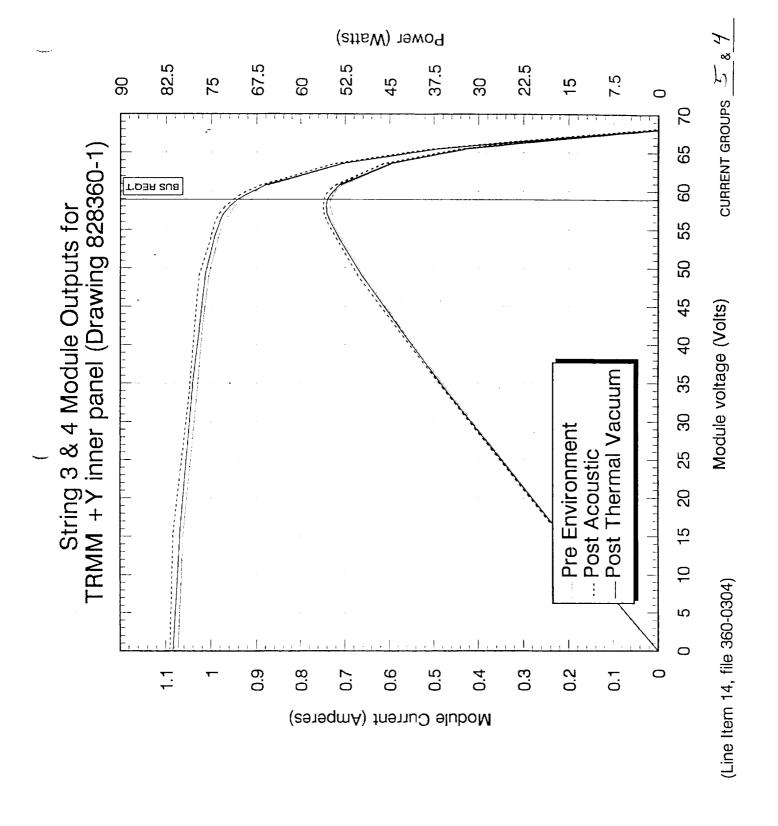


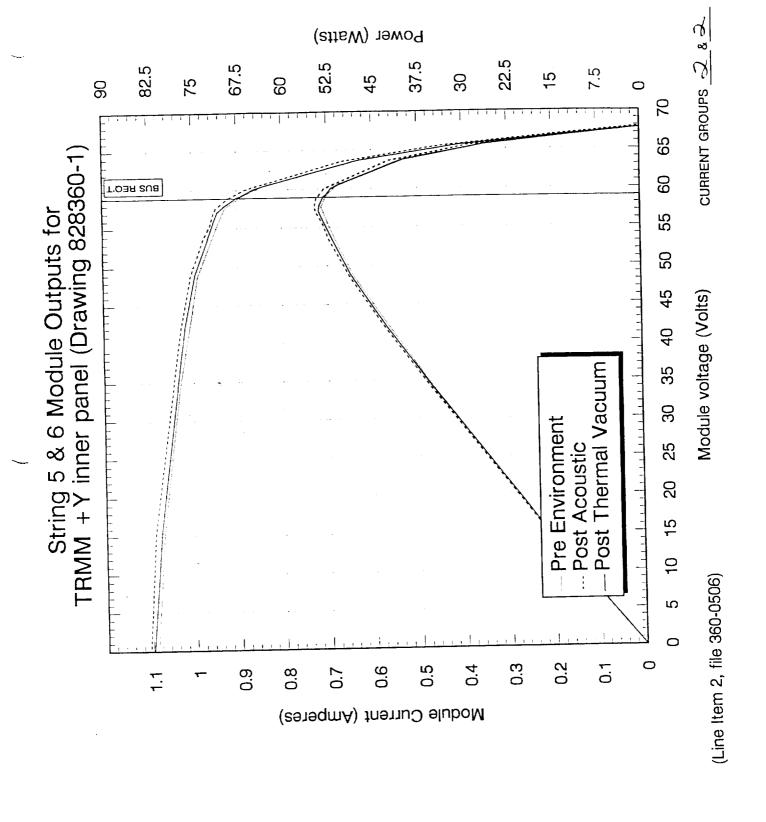


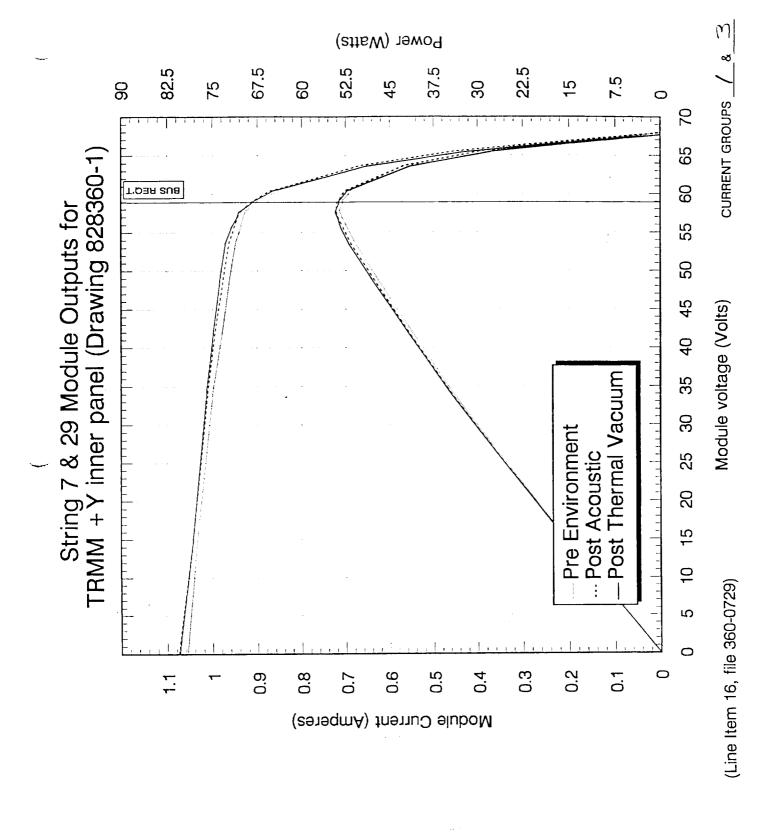


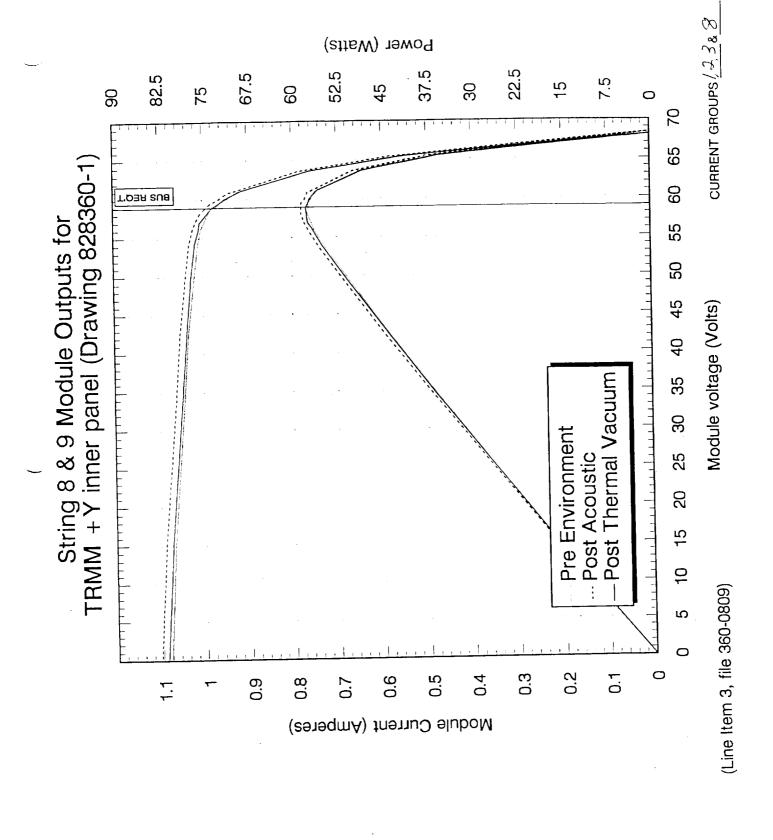


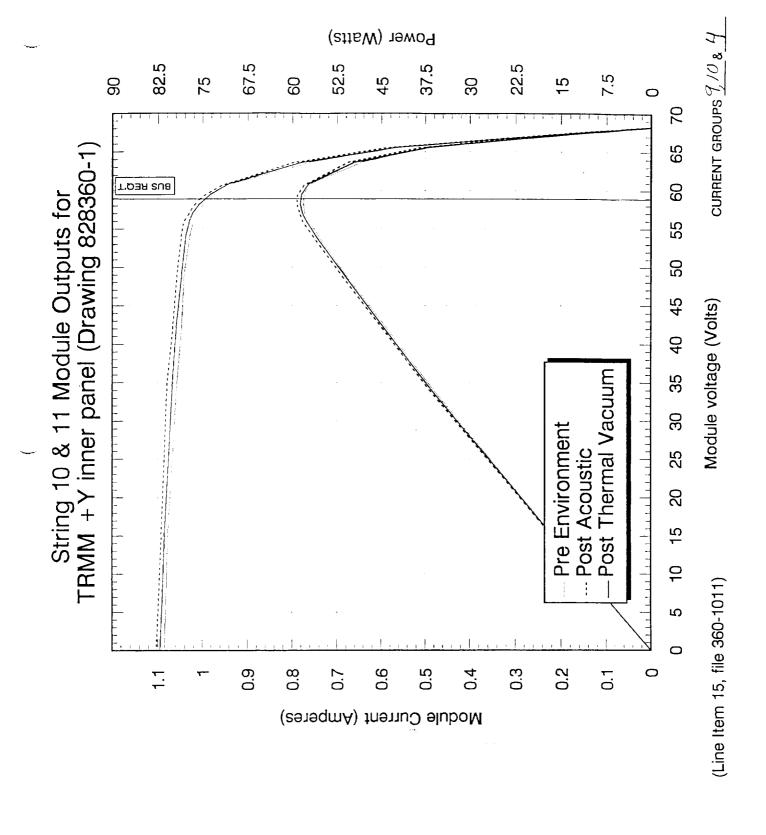


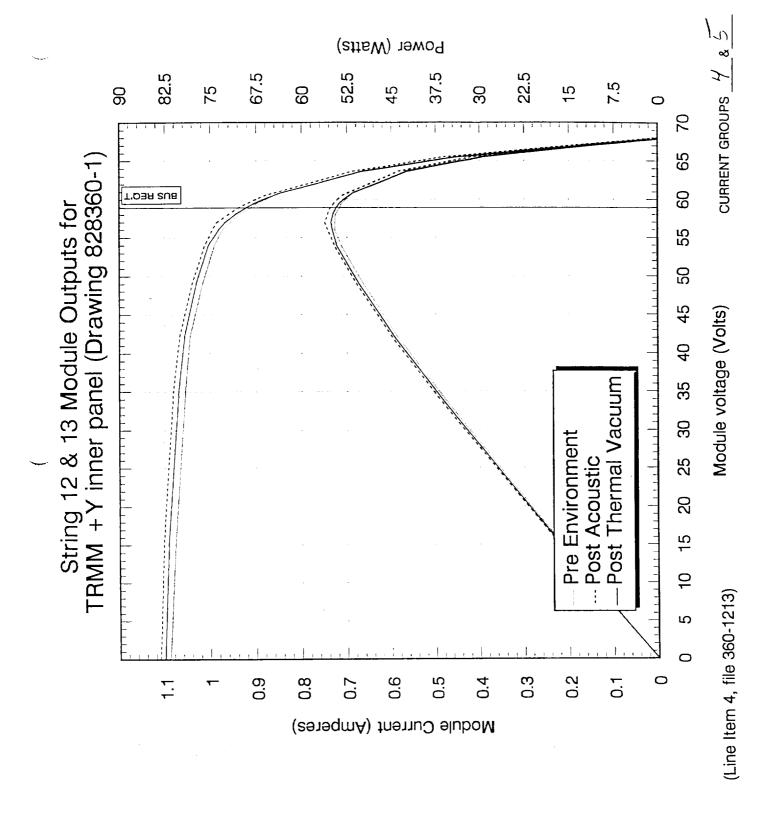


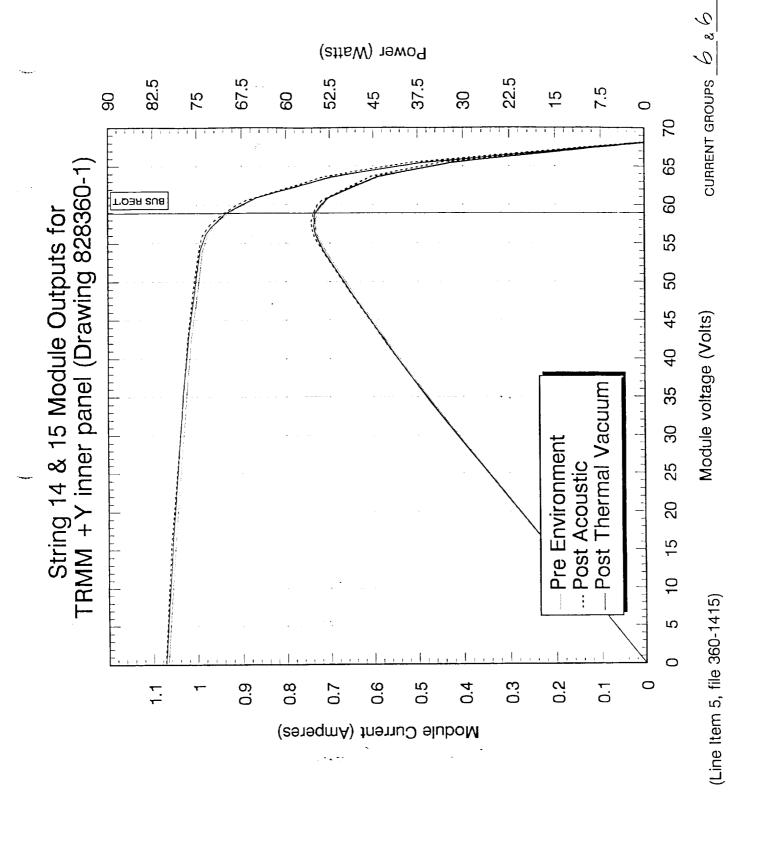


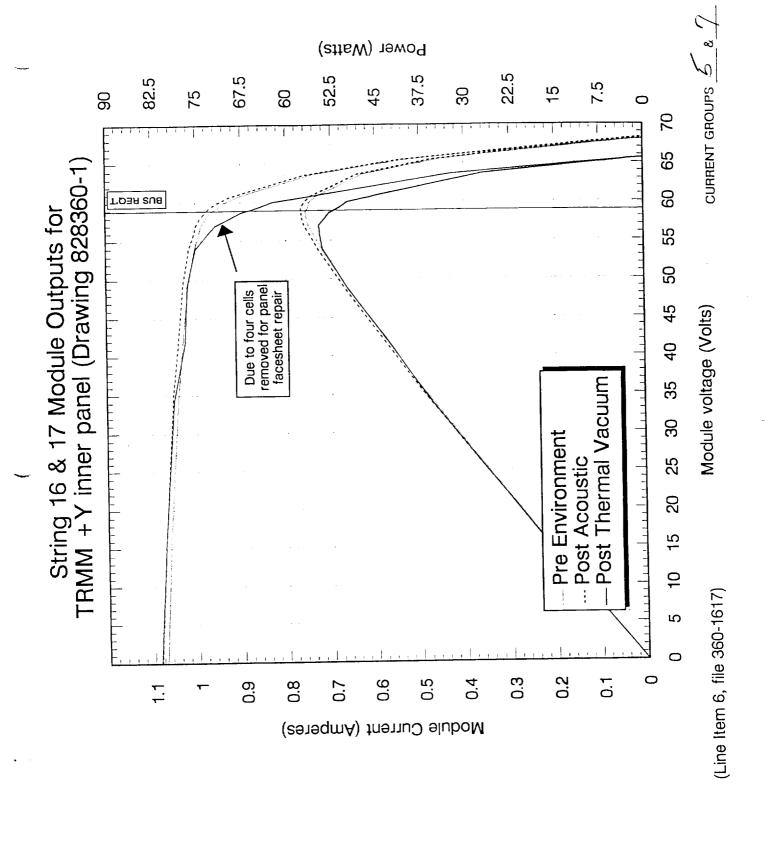


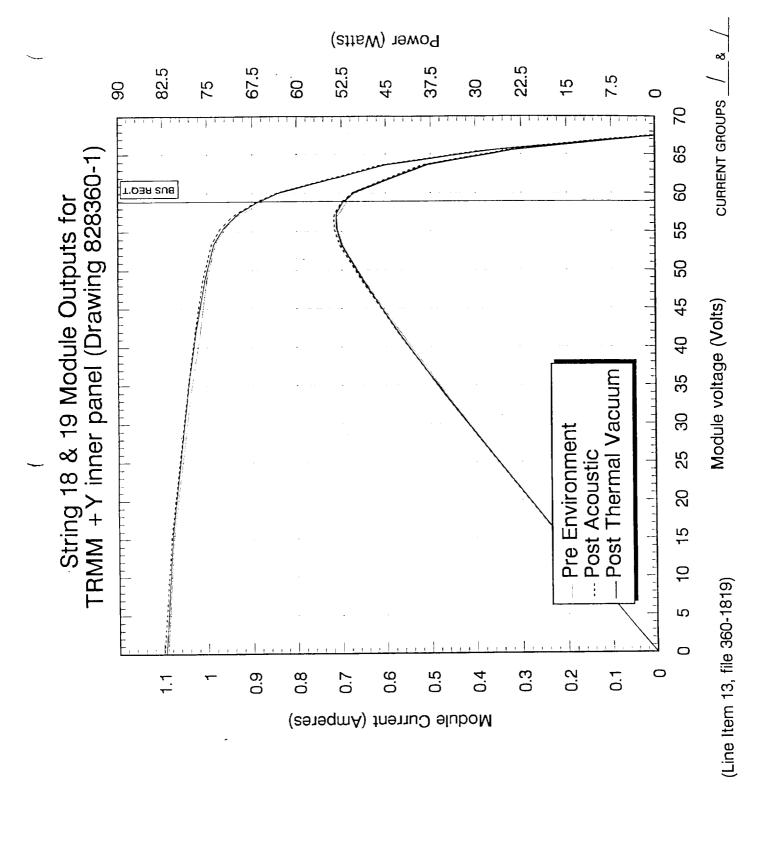


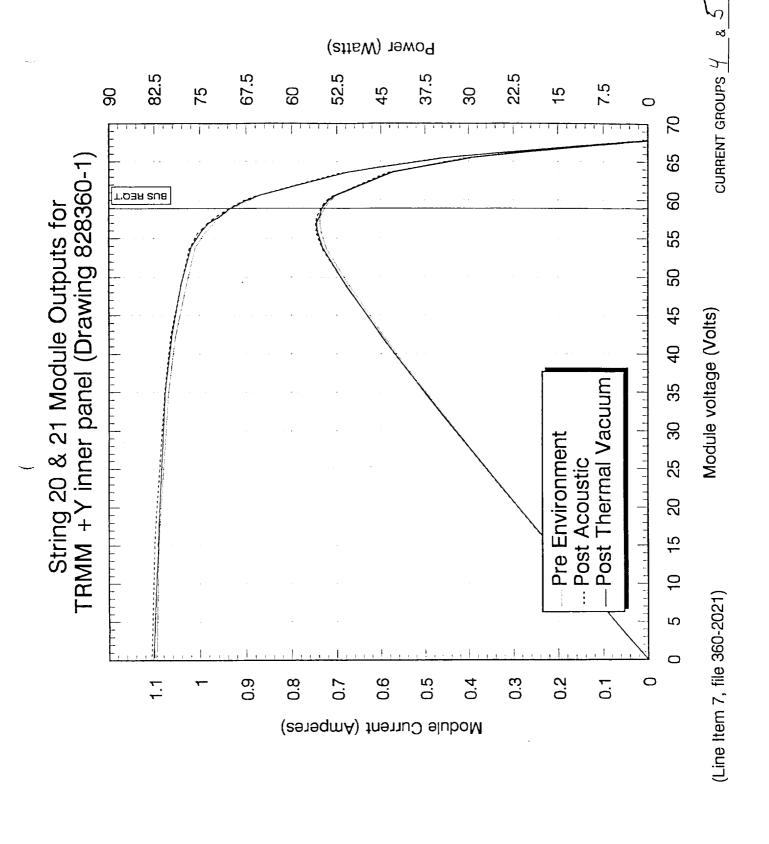


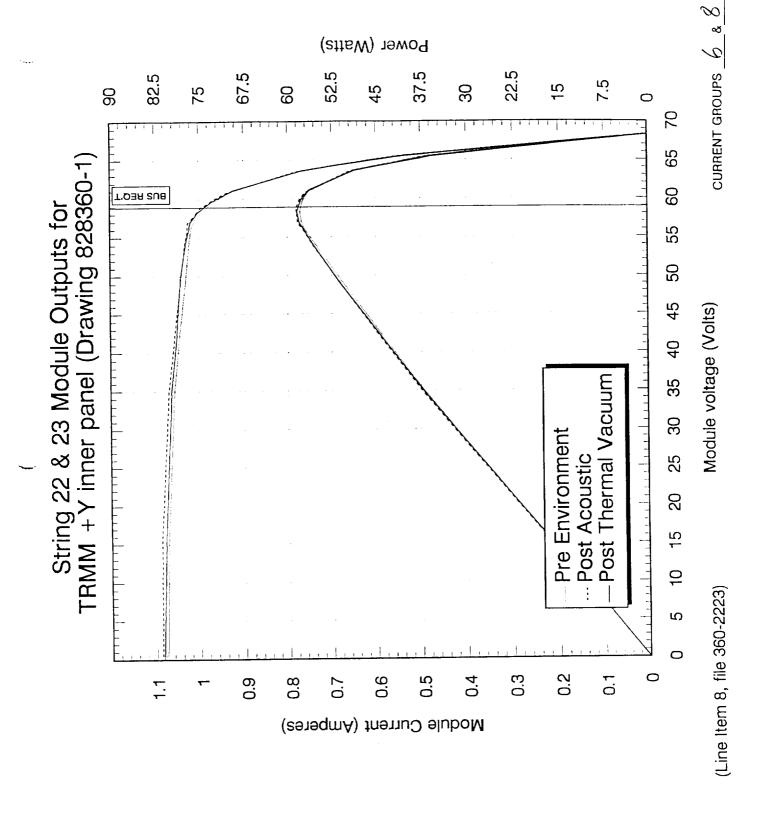


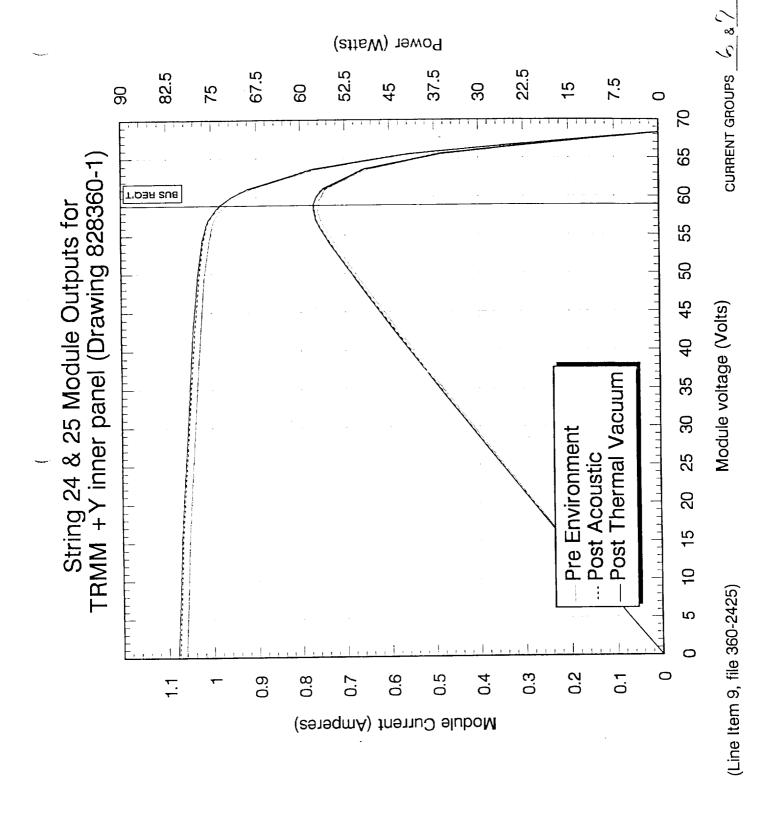


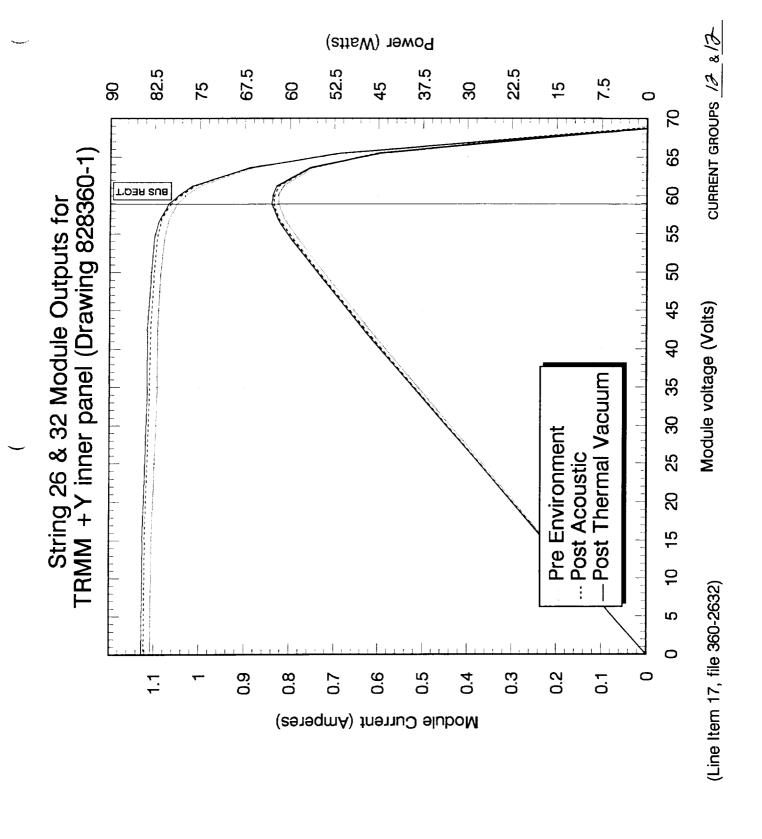


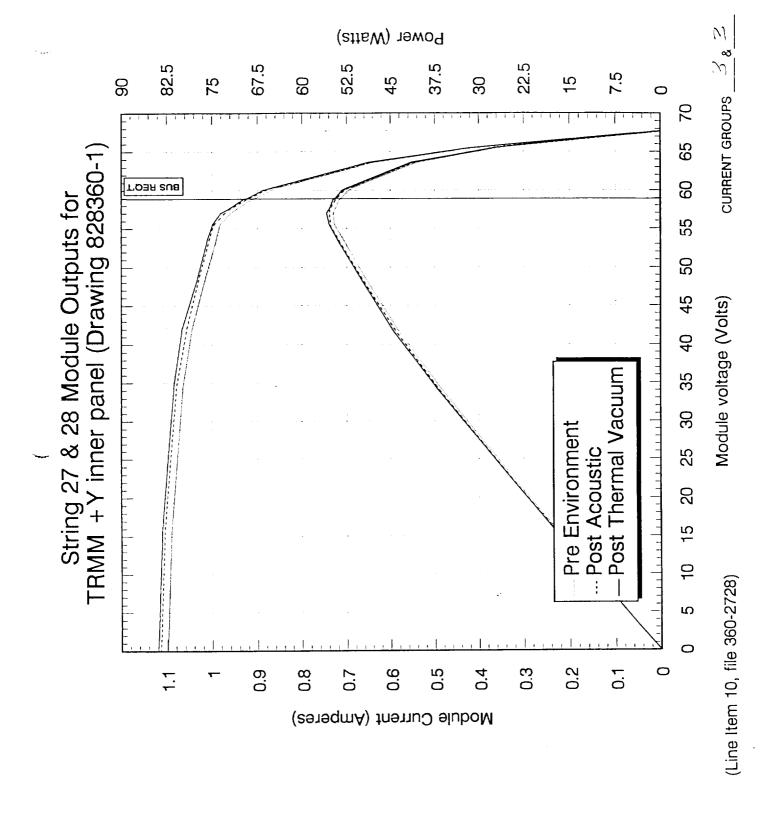


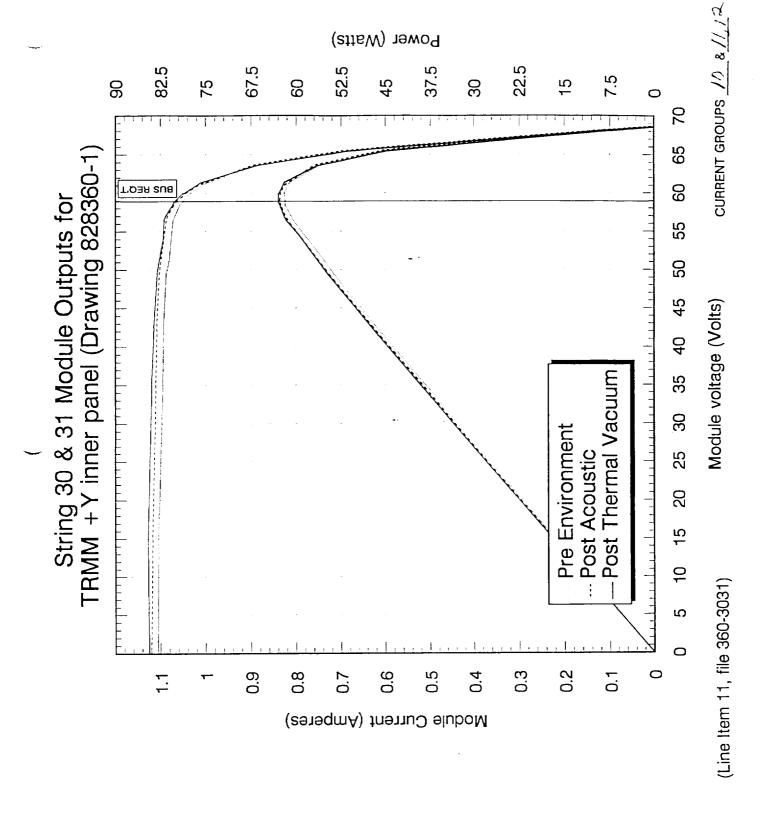


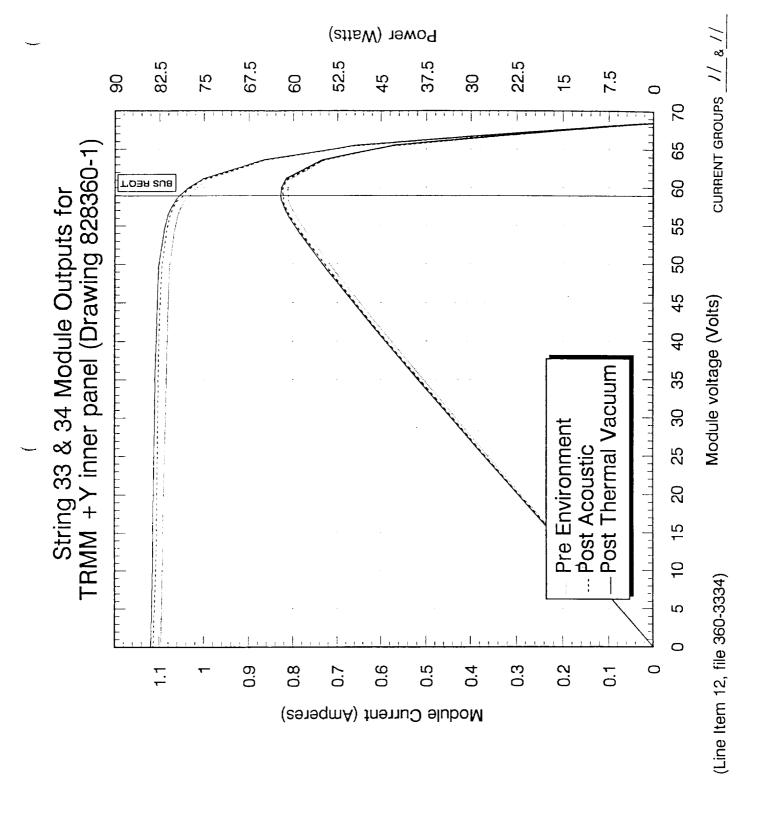


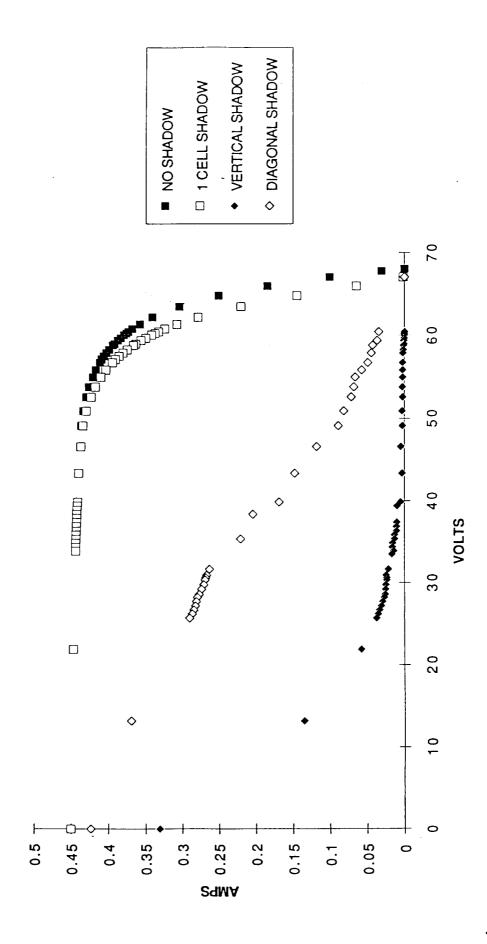


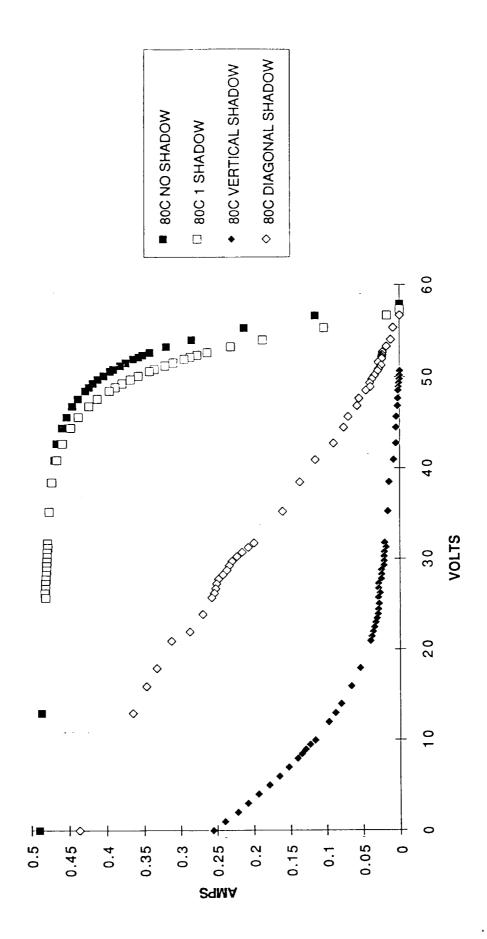


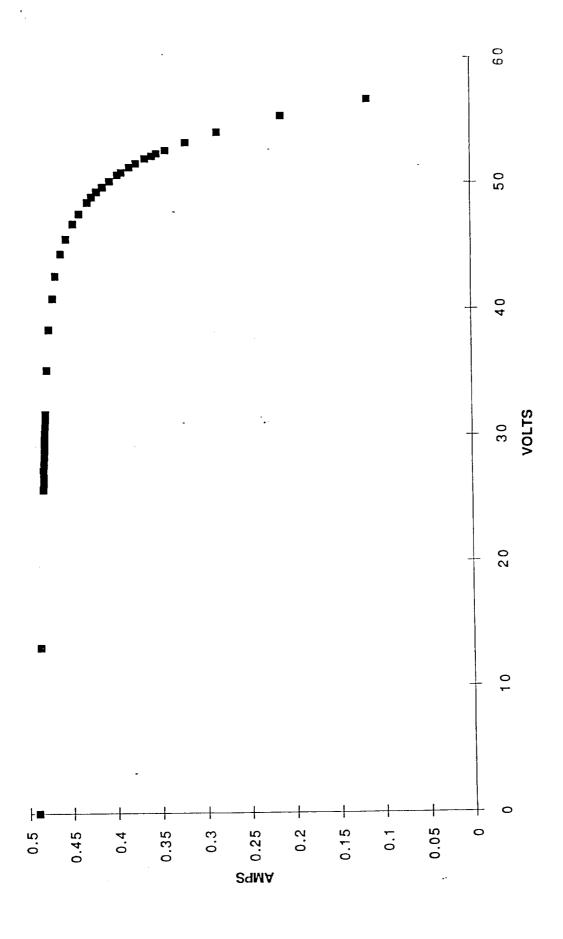




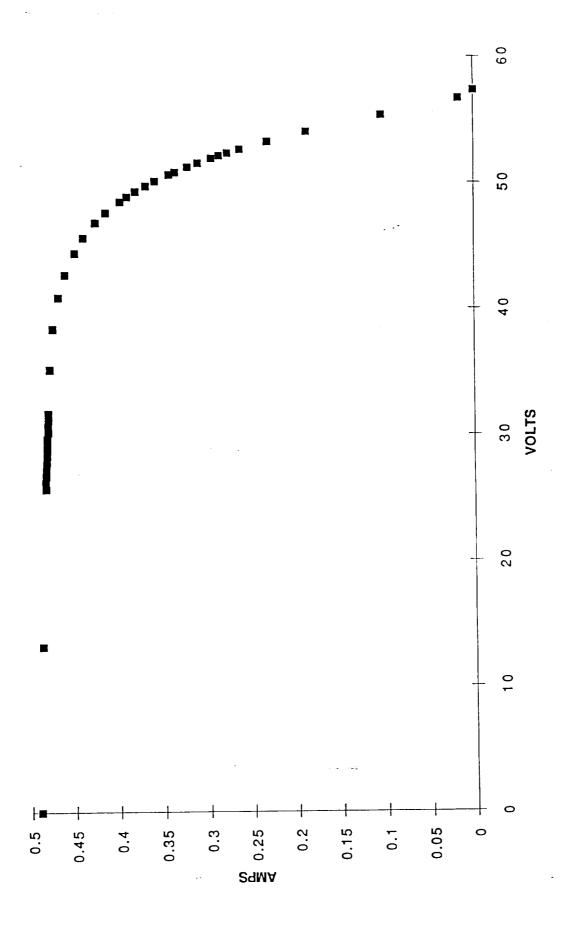




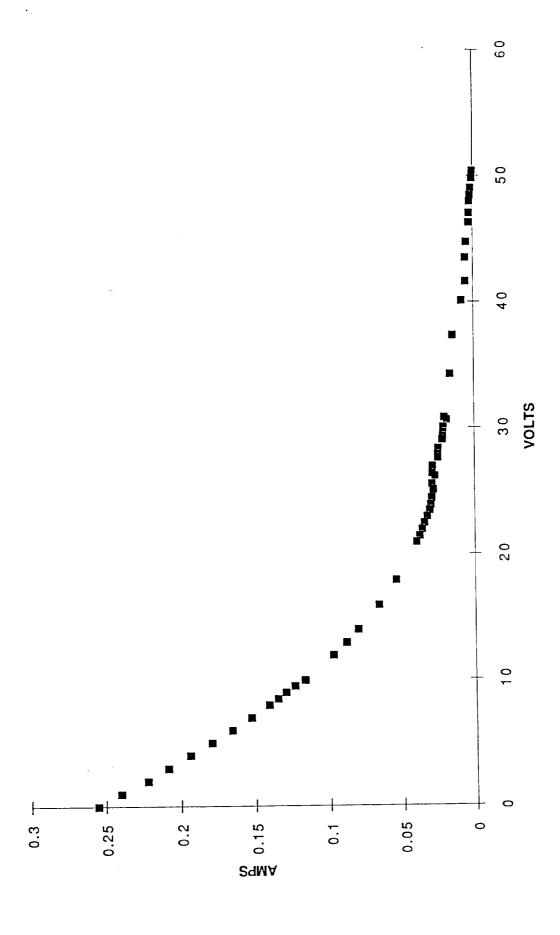




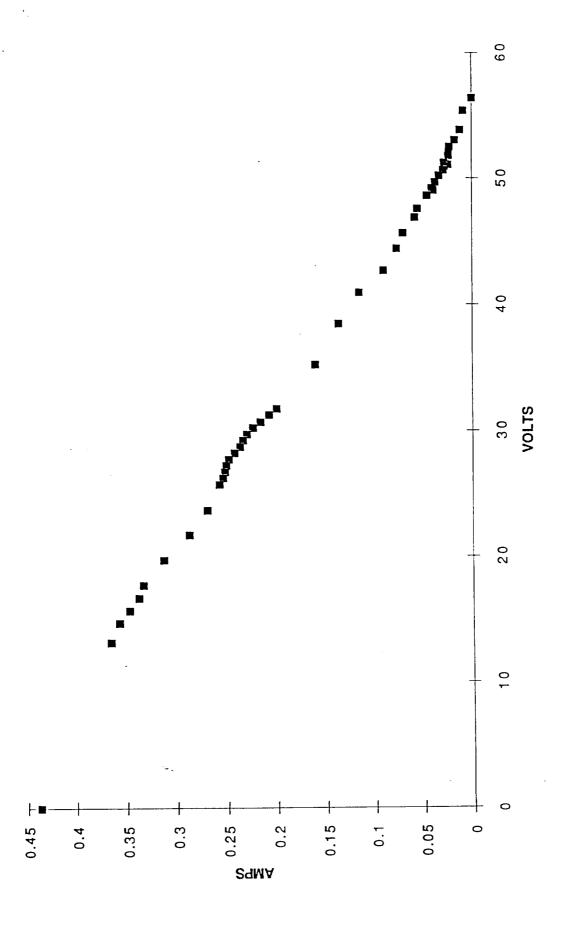
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57.33	0.0003
56.68	0.0171
55.37	0.1035
54.07	0.1875
53.3	0.2312
52.68	0.2626
52.39	0.2765
52.18	0.2861
51.98	0.2948
51.59	0.3099
51.29	0.3214
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50.68	0.3422
50.18	0.3578
49.8	0.3681
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48.95	0.3889
48.57	0.3966
47.67	0.4129
46.88	0.4245
45.67	0.4382
44.48	0.4482
42.76	0.4594
40.96	0.4668
38.48	0.4732
35.27	0.4769
31.78	0.4792
31.29	0.4788
30.76	0.4794
30.28	0.4793
29.77	0.4801
29.27	0.4804
28.77	0.4804
28.28	0.4808
27.77	0.4812
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26.78	0.4818
26.29	0.4823
25.78	0.4819
13.16	0.4868
0	0.4899



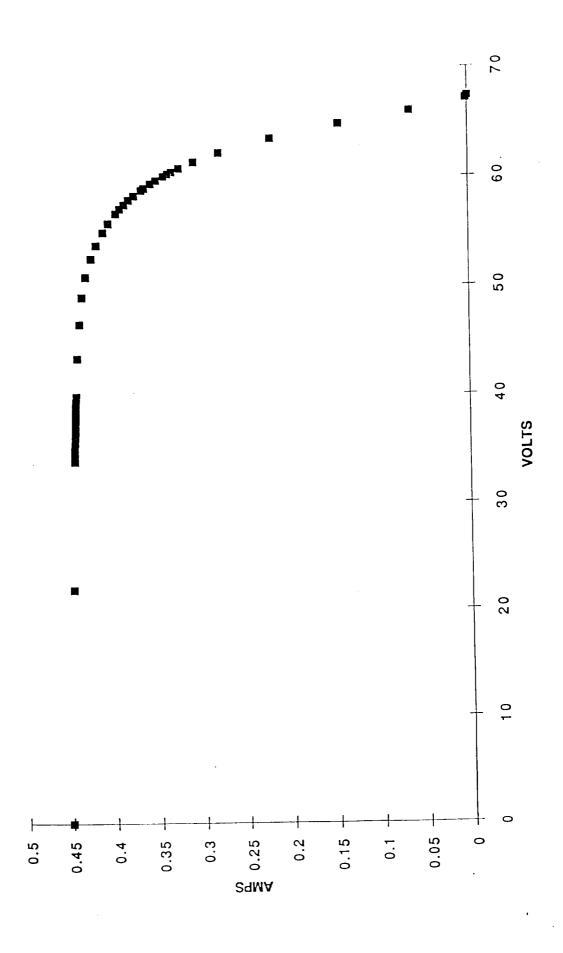
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49.83	0.0007
49.04	0.0017
48.41	0.0021
47.96	0.0025
47.04	0.0026
46.3	0.0031
44.74	0.0049
43.48	0.0054
41.63	0.0055
40.11	0.0084
37.36	0.0147
34.31	0.0166
30.85	0.0208
30.65	0.0192
30.08	0.0214
29.65	0.0215
29.34	0.0217
29.09	0.0222
28.4	0.0251
27.91	0.0253
27.63	0.0254
26.97	0.0289
26.39	0.0292
	0.0275
26.19 25.55	0.0294
	0.0286
25.08	0.0297
23.9	0.0302
23.47	0.0302
22.99	0.0329
22.46	0.0348
	0.0348
21.45	0.0382
20.97	0.0402
17.95	0.0547
	0.0666
15.96	0.0808
13.99 12.97	0.0888
	0.0888
9.97	0.1168
9.5	0.1135
8.99	0.1297
8.499	0.1352
7.99	0.1332
7.99	0.1529
6	0.1323
5	0.1796
4	0.1730
3	0.2086
2	0.2224
1	0.22
0	0.2554
	0.200



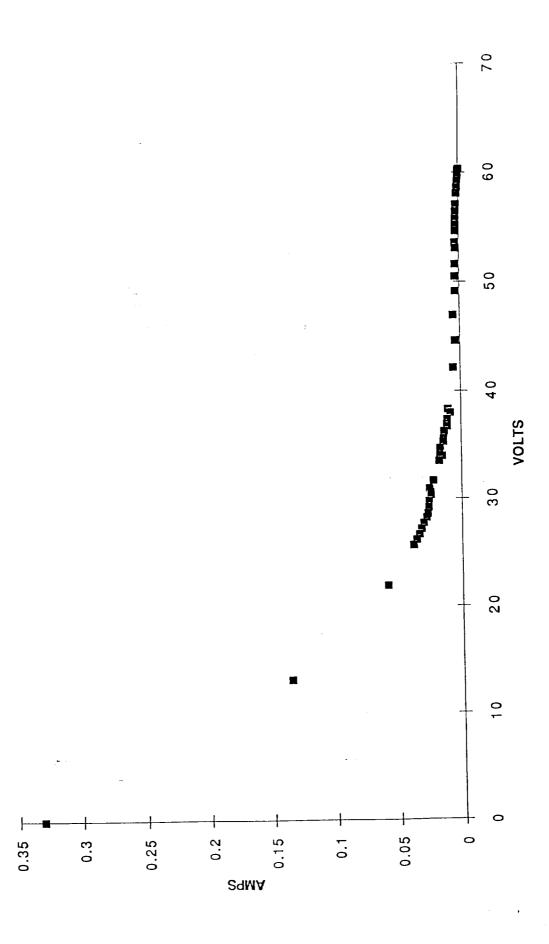
56.38	0.0001
55.39	0.0088
53.87	0.0121
53.05	0.0176
52.5	0.0228
52.1	0.0235
51.92	0.0237
51.79	0.0238
51.23	0.0285
51.09	0.0247
50.94	0.0283
50.65	0.0295
50.21	0.0338
49.71	0.0375
49.21	0.0407
49.06	0.0395
48.64	0.0456
47.59	0.0555
46.9	0.0582
45.68	0.0702
44.47	0.0766
42.75	0.0904
40.98	0.1159
38.47	0.1371
35.26	0.1611
31.78	0.2
31.28	0.2077
30.74	0.216
30.26	0.2234
29.76	0.2297
29.26	0.2335
28.76	0.2367
28.27	0.2422
27.75	0.2481
27.27	0.2506
26.77	0.252
26.28	0.2538
25.77	0.2574
23.71	0.2696
21.72	0.2875
19.73 17.71	0,3128 0,3332
17.71	
10./	0.3378
15.7 14.72	0.347 0.3575
13.18	0.3657
13.18	0.3637
<u>U</u>	0.437

20

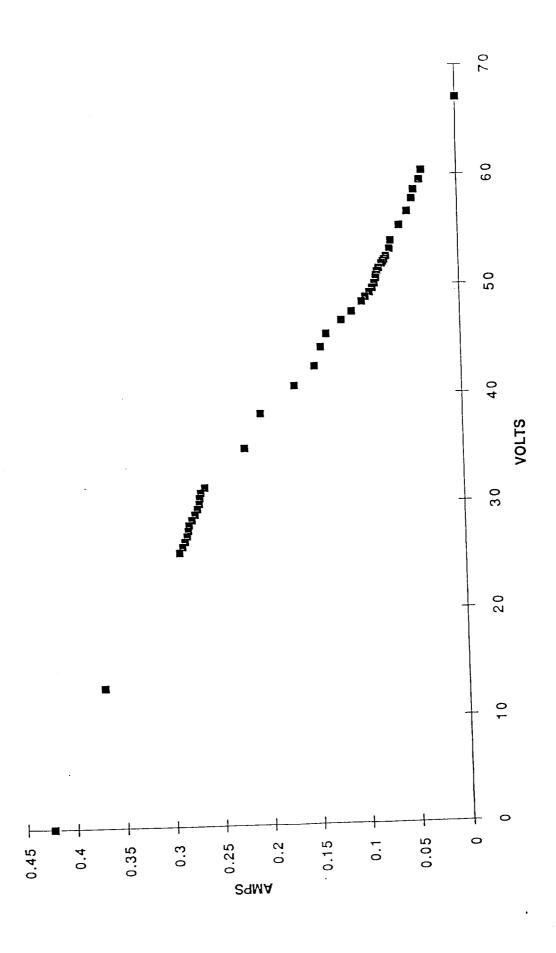
volts		amps	
	68.08		0.0001
	68.05		0.0002
	67.77		0.031
	67.05		0.1009
	65.95		0.1851
	64.78		0.2509
	63.47		0.3043
	62.18		0.3409
	61.35		0.3581
	60.77		0.3686
	60.46		0.3737
	60.26		0.3767
	60.07	†	0.3797
	59.67		0.3841
	59.37	 	0.3879
	58.97		0.3922
	58.79		0.3945
	58.27		0.3995
	57.89	1	0.4029
	57.48	+	0.4064
	57.09		0.4092
	56.7	1	0.4116
<u> </u>	55.8		0.4172
	54.97		0.4213
	53.79	· · · · · · · · · · · · · · · · · · ·	0.4263
	52.57		0.4299
	50.91		0.4338
	49.12		0.4363
	46.59		0.4381
	43.4	+	0.4397
	39.9		0.4414
	39.4		0.4414
	38.92		0.4419
	38.41	+	0.4418
	37.92	 	0.442
	37.41		0.4423
1	36.93		0.4427
 	36.4	+	0.4427
<u> </u>	35.91		0.443
	35.4		0.4433
	34.9		0.4434
	34.5	+	0.4436
			0.4438
-	33.93		0.4468
	21.94		0.4460
L	С	<u> </u>	0.43



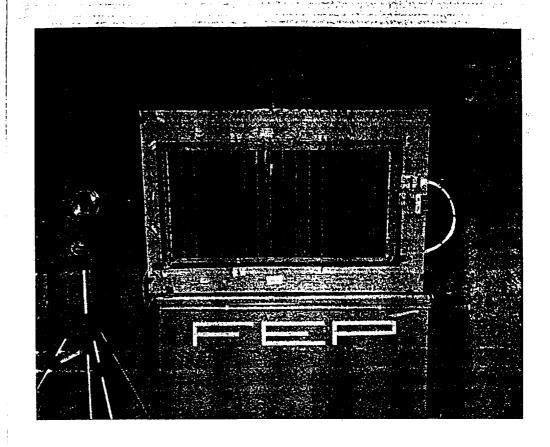
67.41	0.0002
67.39	0.0003
67.39	0.0002
67.16	0.0019
66.01	0.0651
64.84	0.1452
63.53	0.2208
62.24	0.2787
61.4	0.3078
60.83	0.3245
60.52	0.3328
60.32	0.3375
60.11	0.3421
59.73	0.3504
59.43	0.3567
59.02	0.3639
58.84	0.367
58.32	0.3753
57.94	0.3809
57.53	0.3862
57.14	0.3909
56.74	0.395
55.84	0.4036
55.02	0.4101
53.83	0.4176
52.62	0.4233
50.95	0.4298
49.1	0.4342
46.62	0.4372
43.44	0.44
39.94	0.4415
39.44	0.4417
38.94	0.4421
38.45	0.4425
37.95	0.4426
37.44	0.4427
36.97	0.4431
36.42	0.4431
35.94	0.4434
35.43	0.4436
34.93	0.44
34.43	0.443
33.95	0.444
21.95	0.446
	0.450
0	0.430



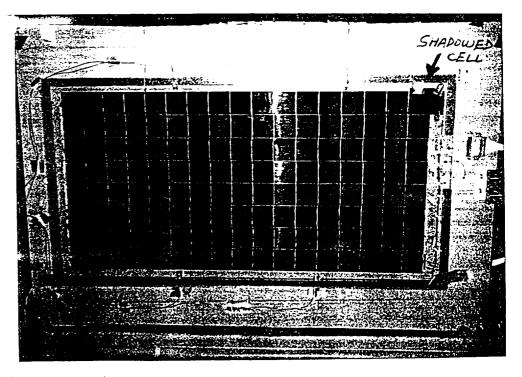
60.33	0.0002
60.2	0.0007
59.88	0.0007
59.63	0.0007
59.21	0.0009
58.97	0.001
58.62	0.0014
58.13	0.002
57.12	0.0024
56.46	0.0026
55.78	0.0029
55.22	0.003
54.68	0.003
53.64	0.0033
53.12	0.0028
51.66	0.0033
50.51	0.0035
49.15	0.0034
46.96	0.0055
44.61	0.0038
42.13	0.0058
38.34	0.0103
38.06	0.0085
38.02	0.0084
37.44	0.0107
36.99	0.011
36.75	0.011
36.29	0.0133
35.61	0.0138
35.3	0.0139
34.72	0.0166
34.09	0.0168
33.98	0.0151
33.53	0.0174
31.7	0.0221
30.95	0.0251
30.61	0.0244
30.36	
29.78	0.0256
29.23	0.0261
28.63	0.0266
28.26	0.0278
27.75	0.03
27.22	0.0318
26.72	0.0337
26.24	0.0356
25.73	0.038
21.96	0.0584
13.17	0.135
0	0.3309



67.05	0.0002
60.41	0.0348
59.55	0.037
58.66	0.043
57.86	0.0448
56.7	0.0498
55.43	0.058
54.03	0.0668
53.3	0.0683
52.65	0.0719
52.35	0.0737
52.17	0.0752
51.98	0.0765
51.58	0.0796
51.28	0.0812
50.9	0.0822
50.67	0.0825
50.18	0.0843
49.78	0.0866
49.39	0.0896
48.96	0.0936
48.56	0.0977
47.65	0.1085
46.88	0.119
45.66	0.1352
44.47	0.1412
42.74	0.1483
40.97	0.1692
38.48	0.2046
35.27	0.2214
31.75	0.2634
31.27	0.2674
30.77	0.2689
30.25	0.2696
29.75	0.2715
29.27	0.2742
28.74	0.2774
28.27	0.2802
27.75	0.2814
27.26	0.2826
26.75	0.2848
26.28	0.2873
25.75	0.2906
13.17	0.3694
0	0.4238

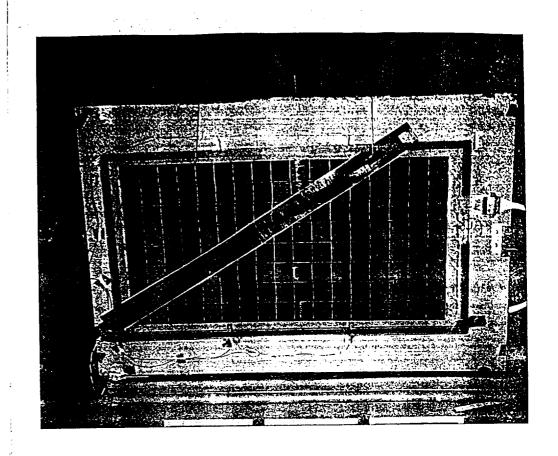


TRIMI-2 MUP NO Shadow RT

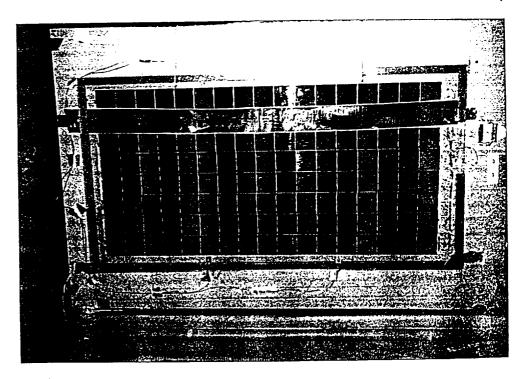


TRMM-2 MVP 1 CEIl Shadowed 55

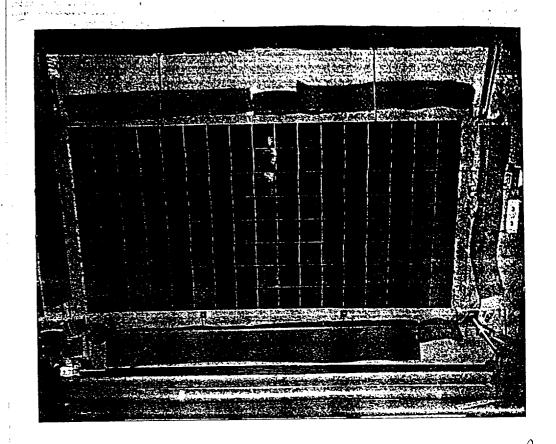




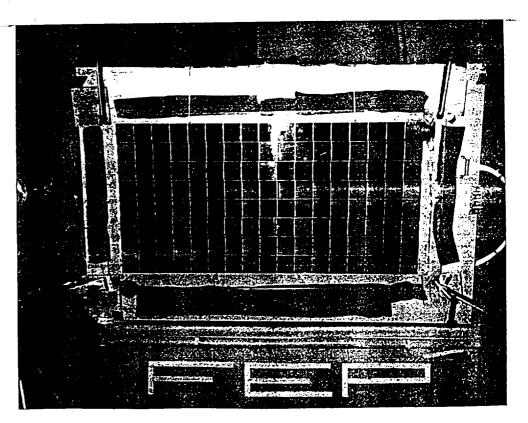
TRMM-2 MUP DIAGONAL Shadow RT



TRMM-2 MUP I ROW Shadowed RT



TRMM-2 MUP MARKED No Shadow



TRAMM-2 MUP I Cell shadow 80°C

Percent Change from initial readings	from ii	nitial rea	dings						Ă	Adjustment*	
Part # (Lot.Cell)	Voc	lsc	Vmp	lmp	Pmp	FF	Actual V _{test}	lvtest	lsc	lmp	lvtest
36.01	0.00%	-0.75%	-0.28%	-2.07%	-2.34%	-1.60%	%90 [.] 0-	-2.13%	-0.1%	-1.4%	-1.5%
36.02	0.43%	-0.91%	0.62%	1.58%	2.21%	2.69%		1.85%	-0.3%	2.2%	2.5%
38.01	1.31%	%99 [.] 0-	0.13%	13.33%	13.47%	12.76%		19.65%	%0.0	14.1%	20.4%
38.02	-0.05%	-0.37%	-0.94%	-1.18%	-2.12%	-1.71%		-2.19%	0.3%	-0.5%	-1.5%
39.01	0.30%	-0.81%	0.49%	-1.30%	-0.81%	-0.29%		-1.13%	-0.2%	-0.7%	-0.5%
39.02	0.00%	-0.63%	-1.81%	-0.45%	-2.26%	-1.64%		-2.12%	%0:0	0.5%	-1.5%
40.01	0.10%	-0.42%	0.49%	-1.55%	-1.07%	-0.74%		%66.0-	0.2%	%6:0-	-0.3%
40.02	-0.04%	-0.55%	0.82%	-2.31%	-1.51%	-0.92%		-1.30%	0.1%	-1.7%	-0.7%
41.01	-0.10%	-0.54%	-0.11%	-1.53%	-1.64%	-1.01%		-1.29%	0.1%	%6:0-	%9.0-
41.02	0.23%	-0.55%	1.37%	-0.73%	0.62%	0.93%		0.89%	0.1%	-0.1%	1.5%
42.01	0.20%	-0.56%	1.02%	-0.91%	0.10%	0.46%		0.12%	0.1%	-0.3%	0.8%
42.02	0.15%	%09:0-	-0.39%	-0.82%	-1.21%	-0.76%	0.00%	-1.47%	0.1%	-0.2%	-0.8%
44.01	0.09%	%99 .0-	0.99%	-1.98%	-1.01%	-0.45%		-0.92%	%0.0	-1.3%	-0.3%
44.02	-0.25%	-0.68%	-0.55%	-1.08%	-1.62%	-0.71%		-1.56%	%0:0	-0.4%	%6:0-
47.01	0.14%	-0.64%	0.27%	0.11%	0.37%	0.87%		-0.08%	%0:0	0.8%	%9.0
47.02	0.14%	-0.63%	0.50%	-2.15%	-1.67%	-1.18%	0.17%	-1.56%	%0.0	-1.5%	%6.0-
Avg all	0.2%	%9.0-	0.2%	-0.2%	%0.0	0.4%	%0:0	0.4%	%0.0	0.5%	1.0%
excluding # 38.01											
Avg	0.1%	-0.6%	0.2%	-1.1%	-0.9%	-0.4%	0.0%	-0.9%	%0.0	-0.4%	-0.3%
Minimum	-0.2%	-0.9%	-1.8%	-2.3%	-2.3%	-1.7%	-0.1%	-2.2%	-0.3%	-1.7%	-1.5%
Maximum	0.4%	-0.4%	1.4%	1.6%	2.2%	2.7%	0.2%	1.8%	0.3%	2.5%	2.5%

*Adjustment made for uniformity of light source on block

Cells meet requirement 4.10.1 for Humidity exposure and no more than 1.5% loss for any cell after exposure

Initial output of Humidity Test Cells	Humidi	ty Test (Sells						∢	Adjustment*	
Part # (Lot.Cell)	Voc	lsc	Vmp	lmp	Pmp	1	Actual V _{test}	lvtest	Isc	lmp	Viest
	(Volts)	(Amperes)	(Volts)	(Amperes)	(Watts)		(Volts)	(Amperes)	(Amperes)	(Amperes) (Amperes) (Amperes)	(Amperes)
36.01	1.0176	0.54221	0.88428	0.50558	0.44709	0.81033	0.87012	0.51208	0.54221	0.50558	0.51208
36.02	1.0146	0.54925	0.86963	0.49226	0.42808	0.76814	0.86963	0.49226	0.54925	0.49226	0.49226
38.01	0.96777	0.53541	0.75146	0.27121	0.20381	0.39333	0.87012	0.20625	0.53541	0.27121	0.20625
38.02	1.0127	0.547	0.88086	0.5055	0.44532	0.80391	0.86963	0.51099	0.547	0.5055	0.51099
39.01	1.0156	0.54495	0.88818	0.50454	0.44812	0.80967	0.86963	0.51387	0.54495	0.50454	0.51387
39.02	1.0215	0.53933	0.88818	0.49589	0.44045	0.79948	0.86963	0.50474	0.53933	0.49589	0.50474
40.01	1.0249	0.53498	0.89697	0.50017	0.44864	0.81824	0.87061	0.51116	0.53498	0.50017	0.51116
40.02	1.0273	0.53532	0.89551	0.50007	0.44782	0.81428	0.86963	0.5099	0.53532	0.50007	0.5099
41.01	1.0244	0.54751	0.8877	0.50907	0.4519	0.80569	0.87109	0.5163	0.54751	0.50907	0.5163
41.02	1.0254	0.54053	0.85791	0.47864	0.41066	0.74092	0.86963	0.47097	0.54053	0.47864	0.47097
42.01	1.0107	0.54558	0.86572	0.50497	0.43716	0.79277	0.86963	0.5019	0.54558	0.50497	0.5019
42.02	1.0107	0.5484	0.87012	0.51433	0.44753	0.80738	0.87012	0.51433	0.5484	0.51433	0.51433
44.01	1.0264	0.54154	0.88477	0.50895	0.4503	0.81017	0.87061	0.51452	0.54154	0.50895	0.51452
44.02	1.0176	0.54879	0.88672	0.5128	0.45471	0.81425	0.86963	0.51978	0.54879	0.5128	0.51978
47.01	1.0215	0.53793	0.89258	0.50055	0.44683	0.81317	0.87061	0.51029	0.53793	0.50055	0.51029
47.02	1.0347	0.54082	0.8833	0.51316	0.45328	0.81005	0.86963	0.51687	0.54082	0.51316	0.51687
AVERAGE	1.017086	0.542472	0.873993	0.488606	0.428856	0.775736	0.8699969	0.489138	0.542472	0.488606	0.489138
STND DEV	0.014287	0.004859	0.033373	0.056796	0.059073	0.100604	0.000473	0.073941	0.004859	0.056796	0.073941

*Adjustment made for uniformity of light source on block

	rillal Output of Hulliarity Test Sells		2						•		
Part # (Lot.Cell)	Voc	sc	Vmp	dml	Pmp	出	Actual V _{test}	lytest	lsc	lmp	lvtest
	(Volts)	(Amperes)	(Volts)	(Amperes)	(Watts)		(Volts)	(Amperes)	(Amperes)	(Amperes) (Amperes)	(Amperes)
36.01	1,0176	0.53814	0.88184	0.49512	0.43664	0.79737	0.86963	0.50119	0.541681	0.4983776	0.504488
36.02	1.019	0.54427	0.875	0.50003	0.43752	0.78884	0.87061	0.50136	0.547851	0.5033199	0.504659
38.01	11 0.98047	0.53186	0.75244	0.30736	0.23127	0.4435	0.87158	0.24677	0.535359	0.3093823	0.248394
38.02	1.0122	0.54498	0.87256	0.49954	0.43589	0.79017	0.87061	0.49981	0.548566	0.5028267	0.503098
39.01	1.0186	0.54055	0.89256	0.49797	0.44448	0.8073	0.87061	0.50805	0.544107	0.5012464	0.511393
39.02	1.0215	0.53595	0.87207	0.49366	0.43051	0.78638	0.87012	0.49406	0.539476	0.496908	0.497311
40.01	1.0259	0.53272	0.90137	0.49242	0.44385	0.81217	0.87012	0.50611	0.536225	0.4956599	0.50944
40.02	1.0269	0.53236	0.90283	0.4885	0.44104	0.80679	0.86963	0.50325	0.535863	0.4917141	0.506561
41.01	_	0.54456	0.88672	0.50126	0.44451	0.79758	0.87061	0.50965	0.548143	0.504558	0.513003
41.02	_	0.53758	0.86963	0.47514	0.41319	0.7478	0.86963	0.47514	0.541117	0.4782662	0.478266
42.01	Υ-	0.54255	0.87451	0.50039	0.4376	0.79645	0.86963	0.50252	0.54612	0.5036823	0.505826
42.02	•	0.54512	0.8667	0.5101	0.4421	0.80124	0.87012	0.50676	0.548707	0.5134562	0.510094
44.01	1.0273	0.53799	0.89355	0.49887	0.44577	0.80652	0.86963	0.5098	0.54153	0.5021523	0.513154
44.02	1.0151	0.54507	0.88184	0.50728	0.44734	0.80846	0.87061	0.51169	0.548656	0.5106176	0.515057
47.01	1.0229	0.5345	0.89502	0.50108	0.44848	0.82024	0.87061	0.50986	0.538017	0.5043768	0.513215
47.02	1.0361	0.53739	0.8877	0.50212	0.44573	0.80052	0.87109	0.50883	0.540926	0.5054237	0.512178
AVERAGE	1.018729	1.018729 0.539099	0.875396	0.485678	0.42662	0.775708	0.8703025	0.487178	0.542646	0.488873	0.490383
STND DEV	0.011786	0.004704	0.033584	0.046682	0.051116	0.087171	0.000569	0.062658	0.004735	0.0469894	0.063071

*Adjustment made for uniformity of light source on block

Absolute change in output () = loss	in out	=()	loss						A	Adjustment*	
Part # (Lot.Cell)	Voc	lsc	Vmp	lmp	Pmp	Ħ	Actual V _{test} I _{Vtest}	lvtest	sc	lmp	lytest
	(Volts)	(Volts) (Amperes)	(Volts)	(Amperes)	(Watts)		(Volts) (Amperes)	(Amperes)	(Amperes)	Amperes) (Amperes) (Amperes)	(Amperes)
36.01	0.	0. (0.00407)	(0.00244)	(0.01046)	(0.01045)	(0.01296)	(0.00049) (0.01089)	(0.01089)	(0.00053)	(0.0072)	(0.0072) (0.00759)
36.02	0.0044	0.0044 (0.00498)	0.00537	0.00777	0.00944	0.0207	0.00098	0.0091	(0.0014)	0.01106	0.0124
38.01	0.0127	0.0127 (0.00355)	0.00098	0.03615	0.02746	0.05017	0.00146	0.04052	(0.00005)	0.03817	0.04214
38.02	(0.0005)	(0.0005) (0.00202)	(0.0083)	(0.00596)	(0.00943)	(0.01374)	0.00098	0.00098 (0.01118)	0.00157	(0.00267)	(0.00789)
39.01	0.003	(0.0044)	0.00438	(0.00657)	(0.00364)	(0.00237)	0.00098	(0.00582)	(0.00084)	(0.00329)	(0.00248)
39.02	o.	0. (0.00338)	(0.01611)	(0.00223)	(0.00994)	(0.0131)	0.00049	(0.01068)	0.00015	0.00102	(0.00743)
40.01	0.001	0.001 (0.00226)	0.0044	(0.00775)	(0.00479)	(0.00607)	(0.00049)	(0.00505)	0.00125	(0.00451)	
40.02	(0.0004)	(0.00296)	0.00732	(0.01157)	(0.00678)	(0.00749)	0.	(0.00665)	0.00054	(0.00836)	(0.00334)
41.01	(0.001)	(0.001) (0.00295)	(0.00098)	(0.00781)	(0.00739)	(0.00811)	(0.00048)	(0.00665)	0.00063	(0.00451)	(0.0033)
41.02	0.0024	(0.00295)	0.01172	(0.0035)	0.00253	0.00688	o.	0.00417	0.00059	(0.00037)	0.0073
42.01	0.002	(0.00303)	0.00879	(0.00458)	0.00044	0.00368	o.	0.00062	0.00054	(0.00129)	0.00393
42.02	0.0015	(0.00328)	(0.00342)	(0.00423)	(0.00543)	(0.00614)	o.	(0.00757)	0.00031	(0.00087)	(0.00424)
44.01	0.0009	0.0009 (0.00355)	0.00878	(0.01008)	(0.00453)	(0.00365)	(0.00098)	(0.00472)	(0.00001)	(0.0068)	(0.00137)
44.02	(0.0025)	0.0025) (0.00372)	(0.00488)	(0.00552)	(0.00737)	(0.00579)	0.00098	(0.00809)	(0.00013)	(0.00218)	(0.00472)
47.01	0.0014	(0.00343)	0.00244	0.00053	0.00165	0.00707	Ö	(0.00043)	0.00009	0.00383	0.00292
47.02	0.0014	0.0014 (0.00343)	0.0044	(0.01104)	(0.01104) (0.00755) (0.00953)	(0.00953)	0.00146	0.00146 (0.00804)	0.00011	(0.00774)	(0.00469)
AVERAGE	0.00164	0.00164 (0.00337)	0.0014	(0.00293)	(0.00293) (0.00224) (0.00003)	(0.00003)	0.00031	0.00031 (0.00196)	0.00017	0.00027	0.00125
STND DEV	0.00328	0.00071	0.00697	0.01113	0.00924	0.01566	0.00073	0.01224	0.0007	0.01086	0.01187

*Adjustment made for uniformity of light source on block

(AS	
REVE	
TRMM	

BT20	0.5041	0.8422	0.4245	0 5079	0.8349	0 4240	98 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.5037	0.8350	0 4252	0.1479	0.5085	0 8354	0.4248	0.0584	0 2020	0.8421	0.4269	0 5502	0.5198	0 8221	0.4273	0 6493	0.5115	0.8353	0.4273	0.6326	0.5110	0.8352	0 4756	0.5235	0000	0 4272	0.6282	0.5114	0 8349	0 4270	0.5656	0.5170	0.4267	0.5116	0.5093	0 8348	0.4252	2 2 2	9349	7.47==	0 2339	0 5108	0 8347	0 4264	0 4249	0 8220	0.4239
BT19	0.5085	0.8349	0 4245	0.5079	0.8347	0.4239	0.1421	0.5041	0 8422	0.4246	0.0015	0.5042	0 8421	0.4246	0.0095	0 5052	0.8421	0.4254	0.20/4	0.5057	0 8422	0.4259	0.3179	0.5063	0.8420	0.4263	0.4124	0.5099	0.4351	0.4230	0.2984	0.0000	0.4261	0.3533	0 5095	0.8349	0 4254	0.1963	0.5101	0 4260	0.3375	0.4985	0.8488	0.4231	5 5555	0.8348	0.4230	-0.3673	0 5057	0.8351	0.4231	0.5059	0.8101	0.4105
8718	0.5076	0.8349	0.4238	0.5038	0 8349	0.4206	0.75	0.00	0.0422	0.4219	-0.4392	0.4960	0.8493	0.4213	-0.6035	0.5064	0.8347	0.422/	0.020	22020	0.6423	0.4230	-0.18/3	0.4980	0.8493	0.4230	0.1995	2/000	2000	00770	-0.0429	0.0014	0 4222	-0.3710	0 5023	0 8422	0 4230	-0.1792	0.5025	0 4231	-0.1750	0.5011	0 8421	0 4220	0 5045	0.8348	0 4212	-0.6265	0 5003	0.8417	0.4211	0.4966	0 8350	0 4147
) 	0.5018	0.8421	0.4226	0.5063	0 8351	0.0250	00000	0.00	0.0300	0.4238	0.3020	0.5018	0.8421	0.4226	0,000	0.5073	0.8347	0.4234	0.5054	1000	9000	97750	0.0338	7900	0.8353	0.4232	9091.0	0.4984	0.6492	0.1506	0.1390	0.000	0.4231	0.1172	0.5077	0.8349	0 4239	0.3097	0.3072	0 4236	0.2354	0.5084	0 8348	0 4244	0.4331	0.8349	0 4237	0.2705	0 5076	0.8347	0 2652	0 4990	0.8422	0.4203
2	0.5050	0.8422	0.4253	0 2000	0.8492	0.4240	0.10/03	1000	0.4250	0.4230	0 1200	0.5010	0.8493	0.4255	0.0443	0.4982	0.8492	0.4231	0.0234	0 000	0.493	0 9765	03/02	15030	0.8419	0.4235	0.4134	2000	0.4241	-0.293R	0.5031	0.8424	0.4238	-0.3538	0.5033	0.8422	0.4239	0.5027	0 8418	0.4232	-0.5053	0.5097	0 8348	0 4255	250	0.8488	0.4254	0.0253	0.5053	0.8420	0 0356	0 5010	0 8423	0.4220
	0.4980	0.8421	0.4194	0.4970	0.8423	0.4190	0.1774	25.00	2000	70000	2000	8105.0	0 8353	0.4192	0000	0000	0.8421	0.4210	0.0134	0170	0.0413	0.3456	0.5165	0.5050	0.6352	0.4210	1000	0.4303	0.4213	0.4612	0.5010	0.8420	0.4218	0.5870	0.5007	0.8421	0.4216	0.5392	0.8421	0.4216	0.5392	0.4983	0 8418	0.000	0.5019	0.8352	0 4192	-0.0427	0 4980	0.8422	0.110	0.4979	0.8349	0 4157
	0.5092	0.8352	0.4253	0.5083	0.6350	0.0011	0 5005	0 8350	0.0000	0.4234	0.0343	0.5048	0.8422	0.4231	2000	70100	0.8353	0 3057	0.5102	0 8351	0.4261	0.1841	100	9000	7907	0.3209	0.3500	0 8424	0 4260	0 1685	0.5101	0.8352	0.4260	0.1764	0.5098	0.8349	0.4256	0.00.0	0 8349	0.4267	0.3359	0.5070	0.8349	0.4233	0.5142	0 8218	0 4226	-0.6423	0.5149	0 8218	-0.5055	0.5105	0 8220	0.4196
	0.5129	0.8352	0.4284	0.5075	0.0423	0.24.0	0.5050	0.8489	0.4287	0.747	1000	0.01.0	0.8352	0.24.0	0.5046	0.00	0.4384	0.0110	0.5092	0.8418	0.4286	0.0631	0.5063	0.3002	0.049	0.3254	0.503.0	0.00	0.4293	0 2099	0.5052	0.8493	0.4291	0.1613	0.5041	0.8489	0.4279	0.1037	0.8421	0.4290	0.1575	0.5090	0.8419	0.0357	0.5081	0 8421	0.4279	-0.1176	0.5036	0.8492	-0.1676	0.5060	0.8350	0.4225
71.10	0.5120	0.8493	0.4348	0.0044	0.0000	A2438	0.5094	0.8551	0.4356	0.1713	0.54.26	0.0120	0.0493	2000	0.600.0	10000	0.0348	0.00	0.5080	0.8548	0 4342	0.1389	5126	0.0120	0.0452	0.4555	0.5122	0.8490	0 4349	0.0037	0.5091	0.8548	0.4352	0.0775	0.5118	0.8490	0.4345	0.5084	0.8551	0 4347	-0.0250	0.5067	0.8418	1 9463	0.5070	0.8419	0.4268	-1 8738	0.5064	0.8420	1 9824	0.5091	0.8351	0.4251
	0.5134	0.8490	0.4359	0.0140	0.4336	-0.5213	0.5173	0.8421	0 4356	0.0503	0.5165		0.0424	0.1331	2000	0000	0.0403	-0 6983	0 5099	0.8493	0.4331	-0.650R	0.5107	0.010	0.0437	0.5050	0.5000	0.8490	0.4333	-0.5878	0.5163	0.8422	0.4348	-0.2412	0.5103	0.8490	0.4332	0.5153	0 8421	0.4339	-0.4476	0.5184	0.8418	0 1174	0.5135	0.8489	0.4359	0.0077	0.5168	0.8420	0 1680	0.5172	0.8349	0.4318
1000	1999	0.8348	0.4076	0.4970	0 4156	-0.2534	0.4998	0.8350	0.4173	0 1540	0.4963	0.430	0.4423	0 3313		0 8401	0.4178	0.2856	0.5012	0.8350	0.4185	0 4428	0.4935	0 100	04190	0.5685	0.4985	0.8418	0.4196	0.7122	0.4983	0.8424	0.4198	0.7431	0.4932	0.8488	0.4100	0.5017	0 8348	0.4188	0.5182	0.4961	0.8422	0 2792	0.4968	0.8423	0.4185	0.4316	0 4963	0.8422	0.3194	0 4996	0.8220	0.4107
30000	0.5035	0.6419	0.4239	0.3022	0.4229	-0 2350	0 4994	0.8489	0 4239	0.0104	0.5077	0 8351	0.4240	0.0197	0.5039	0.8410	0 4242	0.0794	0.5093	0.8350	0.4253	0 3219	0.5104	0.8352	0.4263	0.5605	0 4999	0.8490	0 4244	0.1222		0.8423	0.4255	0.3838	0.5051	0.8422	0.3523	0.5047	0.8418	0.4249	0.2259	0.5086	0.6351	0 1966	0.4987	0.8491	0 4234	0 1064	0.5022	0.8422	-0 2231	0 4961	0 8489	0.4211
COOK	2000	0.0463	0.4239	0.8550	0.4236	-0.0682	0.5001	0.8488	0.4245	0 1482	0.5040	0.8420	0.4244	0 1207	0.5006	0.8491	0.4251	0 2832	0.5015	0.8489	0.4257	0.4387	0.5014	0.8492	0.4258	0.4540	0.5010	0.8493	0.4255	0.3863	0.5013	0.8488	0.4255	0.3872	0 5047	0.8424	0.3066	0.5050	0.8418	0.4251	0.2948	0.000	0.0422	0 3422	0 5004	0.8491		0 2433	0.4966	0.4245	0 1620	0.5041	0 8353	0.4211
0000	0.000	0.000	0.5027	0.8419	0.4232	-0.4354	0 5048	0.8422	0.4251	0 0 180	0.5092	0.8354	0 4254	0.07521	0.5081	0.8353	0.4244	-0.1531	0.5036	0.8416	0.4238	-0 2917	0 5097	0.8351	0.4257	0.1373	0.5085	0.8348	0.4245	-0.1343	0.5050	0.8420	0.4252	0.0339	0.5088	0.0351	-0 0393	0.5168	0.8223	0.4250	-0.0238	0.5098	0.4257	0 1569	0.5094	0 8349	0.4253	0.0546	0 5084	0 4245	-0 1420	0.5103	0.8218	0.4194
0 4455	0 0	0.000	0.3003	0.7750	0.3429	-5 2507	0.4428	0.7934	0.3513	2.7401	0.4201	0 7931	0.3332	-8 3326	0.4992	0.8492	0.4239	14 8557	0.4991	0.8492	0.4238	14.8387	0 5001	0 8492	0.4247	15,0090	0.5043	0.8420	0.4246	14.9961	0.5095	0.8353	0.4256	15.1888	0.5000	0.0407	14 9419	0.5050	0.8419	0.4252	15 1038	01.0	0.6330	15.4074	0.5051	0.8421	0.4262	15.3085	0 5062	0 4264	15 3453	0.5097	0 8218	0.4189
0.5058	0.000	0.000	0.5053	0.8551	0.4321	-0.0872	0.5057	0.8549	0.4323	-0.0315	0 5099	0.8488	0.4328	0 0795	0.5109	0.8491	0.4338	0.3103	0.5081	0.8548	0.4343	0.4294	0.5118	0 8491	0.4346	0.4856	0.5097	0.8492	0.4328	0.0874	0.5154	0.8420	0.4340	0.3474	1,050	0.4335	0.2330	0.5114	0.8489	0.4341	0.3843	27000	0.0432	-0.4051	0.5114	0.8422	0.4307	-0 4082	0.5037	0.4307	-0.4052	0.5111	0.8353	0 4269
0.5087	0.000	0.0422	0.5076	0.8422	0.4275	-0.2167	0.5018	0.8548	0.4289	0.1192	0 5025	0.8550	0.4296	0.2817	0 5055	0.8491	0.4292	0.1847	0.5037	0.8548	0.4306	0.4960	0.5118	0.8418	0.4308	0.5585	0.5032	0.8552	0.4303	0 4437	0.5075	0.8491	0.4309	0.5781	0.50/6	0.4311	0.6094	0.5149	0.8349	0.4299	0.3403	0.5023	0.4295	0.2420	0.5062	0.8491	0.4298	0 3228	0.5050	0.4287	0.0624	0.5048	0.8420	0.4250
0.4965		i	0.4924	0.8349	0.4111	-0.9051		0.8352	0.4119	-0.7053	0.4934	0 8349	1	I.	0.5013	0 8222	0 4122	-0.6446	0.4930	0.8353	0.4118	-0.7341	0.4944	0 8352	0.4129	1	1	0.8350	0.4107	-1.0161	0.4843	0.8492	0.4113	-0.8652	4904	0.4094	1 3288	0.4911	0.8351		1 1480	0.4972	0.4086	-1.5116	0.4878	0.8351	0.4074	-1.8323	0.4900	0.4092	-1 3629	0.4909	0.8223	0.40371
0.5002			_		Ĺ	-0.0701	0.5036	0.8421	0.4241	0 6751	ı	1	ĺ	L	0.4988	0.8418	0.4199	-0.3164		0.8491	0.4191	-0.5017	0.4971	0 8489	0.4220		l.	Ĺ		Ů	l .	0 8491	0.4208	1	0.4930	0.4186	-0 6240	1	0.8419	0.4184	-0.6678	4 6 6 4 4	0.4188	-0.5868	0 4930	0 8490	0 4186	0 6359	0.5013	İ	[,	0 5012	0 8349	0 4185
0.5046	0.8493	0.4286			i .	0.0410	0.4977	0.8649	0.4305	0.4423	0 5023	0.8549	0.4294	0.2002	0.4960	0.8599	0.4265	-0.4798	0.4991	0.8549	0.4267	-0.4397	0.4997	0.8598	0.4296	0.2526	0.5037	0.8489	0.4276	-0.2259	0.5036	0 8490	0.4276	-0 2340	0.0104	0.4262	-0.5447	0.5035	0.8490	0.4275	-0.2539	2000	0.4271	-0.3336	0 5039	0.8489	0.4278	-0 1861	0.5029	0.4270	-0.3617	0 5024	0.8490	0.4265
1 lomax	1 Vomax	1 Pmay	2b I pmax	2b Vpmax	2b Pmax	2b delta%	2d I pmax	2d Vpmax	2d Pmax	2d delta%	2f I pmax	2f Vomax	2f Pmax	2f delta%	2h I pmax	2h Vomax	2h Pmax	2h delta%	2j I pmax	2ј Уртах	2) Pmax	2j delta%	21 pmax	2 Vomax	21 Pmax	21 delta%	2n I pmax	2п Уртах	2n Pmax	2n delta%	2р Іртах	2p Vpmax	2p Pmax	2p delta%	2r Vomax	2r Pmax	2r delta%	2t I pmax	2t Vpmax	21 Ртах	2t delta%	3b Vomax	35 Pmax	3b delta%	3d I pmax	3d Vpmax	3d Pmax	3d delta%	St I pmax	3f Pmax	3f delta%	3h I pmax	3h Vpmax	3h Ртах

BT20	0.5121	0 8218	0 4208	-0 8814	0.5158	0.8100	0.4178	-1.6168	0.5243	0.8100	0.4247	0.0306	0.5030	0.8221	0.4135	-2 6690
BT19	0.5061	0.8100	0.4099	3.5629	0.5113	0.7930	0.4055	-4.7072	0.5072	0.8100	0.4108	3 3383	0.5032	0.7930	03880	-6 3926
BT18	0.5076	0.8218	0.4171	-1.5941	0.5016	0.8220	0.4123	-2.7843	0.5095	0.8220	0.4188	1.1906	0.4998	0.8101	0.4049	-4 6698
BT17	0.5113	0.8218	0.4202	-0.5663	0.4993	0.8352	0.4170	-1.3310	0.5159	0.8220	0.4241	0.3547	0.5016	0.8220	0.4123	-2.4861
BT16	0.5090	0.8222	0.4185	-1.6275	0.5073	0.8222	0.4171	1.9681	0.5141	0.8221	0.4226	-0.6316	0.5017	0.8220	0.4124	-3.1313
BT15	0.4961	0.8220	0.4078	-2.8376	0.4981	0.7931	0.3950	-6.1570	0.5043	0.7930	0.3999	-4.8651	0.4885	0.7929	0.3873	-8.2705
BT14	0.5121	0.8103	0.4150	-2.4892	0.5106	0.7927	0.4048	-5.0725	0.5186	0.7930	0.4112	-3.4125	0.5065	0.7932	0.4018	-5.8563
BT13	0.5041	0.8351	0.4210	-1.7579	0.5010	0.8220	0.4118	-4.0192	0.5082	0.8224	0.4179	-2.4956	0.5012	0.8099	0.4059	-5.5312
BT12	0.5137	0.8222	0.4224	-2.9542	0.5089	0.8099	0.4122	-5.5036	0.5189	0.8100	0.4203	-3.4576	0.5053	0.8100	0.4093	-6.2421
BT11	0.5227	0.8219	0.4296	-1.4593	0.5002	0.8099	0.4051	-7.5941	0.4998	0.8223	0.4110	-6.0564	0.4940	0.8103	0.4003	-8.8907
BT10	0.4984	0.8221	0.4097	-1.6874	0.4937	0.8220	0.4058	-2.6680	0.5091	0.8099	0.4123	-1.0498	0.4964	0.8102	0.4022	-3.5967
BT9	0.5062	0.8350	0.4227	-0.2886	0.5019	0.8352	0.4192	-1.1235	0.5094	0.8223	0.4189	-1.1977	0.4995	0.8223	0.4107	-3.2034
BT8	0.4991	0.8422	0.4203	-0.8359	0.5009	0.8219	0.4117	-2.9552	0.5079	0.8222	0.4176	-1.4992	0.4928	0.8219	0.4050;	-4.6474
BT7	0.5143	0.8099	0.4165	-2.0489	0.5070	0.8102	0.4108	-3.4799	0.5136	0.8103	0.4162	-2.1375	0.4992	0.8103	0.4045	-5.0838
BT6	0.5111	0.8218	0.4200	14.0654	0.5042	0.8220	0.4145	12.9106	0.5187	0.8100	0.4201	14.0910	0.5051	0.8100	0.4091	11.7779
BT5	0.5082	0.8348	0.4242	-1.9361	0.5064	0.8349	0.4228	-2.2861	0.5127	0.8355	0.4284	-0.9567	0.4976	0.8352	0.4156	-4.0577
BT4	0.5034	0.8349	0.4203	-1.9364	0.5061	0.8101	0.4100	-4.4966	0.5104	0.8103	0.4136	-3.5906	0.4958	0.8101	0.4016	-6.6674
BT3	0.4925	0.8218	0.4047	-2.4928	0.4981	6608.0	0.4034	-2.8295	0.4944	0.8222	0.4065	-2.0492	0.4914	0.8101	0.3981	-4.2058
BT2	0.5001	0.8348	0.4175	-0.8946	0.4978	0.8354	0.4159	-1,2880	0.5049	0.8353	0.4217	0.1244	0.4933	0.8349	0.4119	-2.2732
BT1	0.5018	0.8490	0.4260	-0.5935	0.5084	0.8222	0.4180	-2.5240	0.5094	0.8353	0.4255	-0.7180	0.4970	0.8351	0.4150	-3.2556
SEQ	4b I pmax	4b Vpmax	4b Pmax	4b delta%	4d I pmax	4d Vpmax	4d Pmax	4d delta%	4f I pmax	4f Vртах	4f Pmax	4f delta%	4h I pmax	4hVpmax	4h Pmax	4h delta%

BT20	0.4881	0.4884	0.0614	0.4902	0 4284	0.4891	0.2045	0.4917	0.7322	0.4936	1,1143	0.4924	0 8733	0.4919	0.7725	0.4926	0 9135	0.4922	0.8330	0.4918	0.7523	0.4903	0.4487	0.4901	0 4091	0.4914	0.6716	0.4870	-0.2259	BT20	0.4810	-1.4761	0.4730	-3.1924	0.4835	-0.9514	0.4701	3.8290
BT19	0.4887	0.4890	0.0613	0.4907	0.4076	0.4898	0.2246	0.4908	0.4279	0.4919	0.6505	0.4925	0.7716	0.4914	0.5495	0.4915	0.5697	0.4904	0.3467	0.4917	0.6101	0.4892	0.1022	0 4879	-0.1640	0.4883	-0.0819	0.4623	-5.7106	BT19	0.4618	-5.8250	0.4479	-9.1092	0.4562	-7.1241	0.4401	-11.0429
BT18	0.4898	0.4864	0669.0	0.4886	0.2456	0.4871	-0.5543	0.4893	-0.1022	0.4898	0.000	0.4901	0.0612	0.4899	0.0204	0.4883	-0.3072	0.4891	-0.1431	0.4892	-0.1226	0.4890	-0.1636	0.4870	-0.5749	0.4863	-0.7197	0.4770	-2.6834	B718	0.4796	-2.1268	0.4704:	-4 1241	0.4776	-2.5544	0.4596	-6.5709
BT17	0.4880	0.4877	0.0615	0.4895	0.3064	0.4893	0.2657	0.4896	0.3268	0.4897	0.3472	0.4892	0.2453	0.4896	0.3268	0.4885	0.1024	0.4900	0.4082	0.4897	0.3472	0.4906	0.5300	0.4895	0.3064	0.4899	0.3878	0.4852	-0.5771	BT17	0.4823	-1.1818:	0.4770	-2.3061	0.4854	-0.5356	0.4714	-3.5214
BT16	0.4923	0.4920	-0.0610	0.4932	0.1825	0.4932	0.1825	0.4899	-0.4899	0.4910	-0.2648	0.4910	-0.2648	0.4906	-0.3465	0.4912	-0.2239	0.4906	-0.3465	0.4899	-0.4899	0.4934	0.2229	0.4932	0.1825	0.4930	0.1420	0.4875	-0.9846	BT16	0.4809	-2.3706	0.4776	-3.0779	0.4834	-1.8411	0.4717	-4.3672
BT15	0.4859	0.4856	-0.0618	0.4856	-0.0618	0.4866	0.1439	0.4886	0.5526	0.4881	0.4507	0.4888	0.5933	0.4884	0.5119	0.4880	0.4303	0.4877	0.3691	0.4887	0.5729	0.4862	0.0617	0.4853	-0.1236	0.4858	-0.0206	0.4798	-1.2714	BT15	0.4643	-4.6522	0.4361	11.4194	0.4420	-9.9321	0.4243	-14.5180
BT14	0.4896	0.4882	-0.2868	0.4896	0.000	0.4894	-0.0409	0.4913	0.3460	0.4906	0.2038	0.4915	0.3866	0.4921	0.5080	0.4913	0.3460	0.4913	0.3460	0.4920	0.4878	0.4866	-0.6165	0.4853	0.8860	0.4865	-0.6372	0.4801	1.9788	BT14	0.4671	-4.8170	0.4397	-11.3486	0.4479	-9.3101	0.4365	-12.1649
BT13	0.4964	0.4957	-0.1412	0.4971	0.1408	0.4967	0.0604	0.4967	0.0604	0.4977	0.2612	0.4980	0.3213	0.4979	0.3013	0.4972	0.1609	0.4972	0.1609	0.4982	0.3613	0.4967	0.0604	0.4965	0.0201	0.4961	-0.0605	0.4877	-1.7839	BT13	0.4848	-2.3927	0.4673	-6.2273	0.4747	-4.5713	0.4582	-8.3370
RT12	0.5052	0.5044	-0.1586	0.5053	0.0198	0.5057	0.0989	0.5040	-0.2381	0.5044	-0.1586	0.5061	0.1778	0.5049	-0.0594	0.5052	0.0000	0.5049	-0.0594	0.5053	0.0198	0.4932	-2.4331	0.4931	-2.4539	0.4930	-2.4746	0.4901	-3.0810	BT12	0.4850	-4.1649	0.4591	-10.0414	0.4731	-6.7850	0.4609	-9.6116
BT11	0.5054	0.5018	-0.7174	0.5057	0.0593	0.5051	-0.0594	0.5024	-0.5971	0.5022	-0.6372	0.5028	-0.5171	0.5020	-0.6773	0.5039	-0.2977	0.5024	-0.5971	0.5033	-0.4172	0.5053	-0.0198	0.5046	-0.1585	0.5045	-0.1784	0.5003	-1.0194	BT11	0.4953	-2.0392	0.4574	-10.4941	0.4648	-8.7349	0.4511	-12.0372
RT10	0.4815	0.4803	-0.2498	0.4829	0.2899	0.4834	0.3930	0.4836	0.4342	0.4846	0.6397	0.4853	0.7830	0.4853	0.7830	0.4857	0.8647	0.4847	0.6602	0.4850	0.7216	0.4831	0.3312	0.4834	0.3930	0.4834	0.3930	0.4706	-2.3162	BT10	0.4681	-2.8626	0.4597	-4.7422	0.4678	-2.9286	0.4555	-5.7080
BTG	0.4902	0.4891	-0.2249	0.4921	0.3861	0.4907	0.1019	0.4914	0 2442	0.4923	0.4266	0.4939	0.7491	0.4918	0.3253	0.4931	0.5881	0.4928	0.5276	0.4922	0.4063	0.4916	0.2848	0.4898	-0.0817	0.4896	-0.1225	0.4869	-0.6778	BT9	0.4883	-0.3891	0.4824	-1.6169	0.4790	-2.3382	0.4696	-4.3867
BTB	0.4922	0.4915	-0.1424	0.4931	0.1825	0.4928	0.1218	0.4941	0.3845	0 4945	0.4651	0.4950	0.5657	0.4934	0.2432	0.4948	0.5255	0.4936	0.2836	0.4931	0.1825	0.4934	0.2432	0.4935	0.2634	0.4928	0.1218	0.4879	-0.8813	BT8	0.4864	-1.1924	0.4713	-4.4345	0.4792	-2.7129	0.4627	-6.3756
710	0.4897	0.4888	-0.1841	0.4916	0.3865	0.4905	0.1631	0.4900	0.0612	0.4896	-0.0204	0.4912	0.3054	0.4903	0.1224	0.4905	0.1631	0.4908	0.2241	0.4911	0.2851	0.4908	0 2241	0.4904	0.1427	0.4901	0.0816	0.4814	-1.7241	817	0.4745	-3.2034	0.4612	6.1795	0.4686	-4.5028	0.4532	-8.0538
DTG	0.4075	0.3640	-11.9505	0.3891	-4 7289	0.3577	-13 9223	0.4912	17 0399	0.4907	16.9554	0.4911	17.0230	0.4917	17.1243	0.4916	17,1074	0.4916	17 1074	0.4916	17 1074	0.4934	17 4098	0.4925	17 2589	0.4933	17.3931	0.4795	15.0156	ВТ6	0.4812	15.3159	0.4861	16.1695	0.4706	13.4084	0.4615	11.7010
a T C	0 5019	0.5010	\perp	. _	0.0597	0.5029		-	0.4750	0.5038	0.3771	0.5052	0.6532	0.5028	0.1790	0.5044	0.4956	0.5038	0.3771	0.5049	0.5942	0.500	03800	0.4996	-0 4604	0.5002	-0.3399	0.4952	-1.3530	815	0.4900	-2.4286	0.4884	-2.7641	0.4942	1.5581	0.4786	4.8684
7.10	4079	0.4967	-0.2217	0.4982	0.1807	0.4080	0.3207	0.4090	7046.0	2002	0.394	0.5005	0 6394	0.4998	0.5002	0.5004	0.6195	0.5008	0.6989	0.5003	0 5005 0 5006	0.4986	0.2807	0.4990	0 3407	0.4976	0.0603	0.4927	-0.9336	BT4	0.4853	-2 4727	0.4660	-6.7167	0.4687	6.1020	0.4541	-9.5133
e E	012	0.4734	1 1618	0.4757	76790	0.4755	0.7150	0.4762	0.40	0.7740	0.4743	0.4768	-0.4404	0.4745	-0 9273	0.4753	0.7574	0.4720	-1 4619	0.4723	1 3074	0.4708	1 7537	0.4694	2 0239	0.4709	-1 6989	0.4603	-4.0408	BT3	0.4595	-4 2220	0.4566	-4 8839	0.4606	-3 9731	0.4506	-6.2805
3	719	0.4070	0.2550	0.4045	8109.0	3000	0.3064	0.000	7440	11110	0.4000	0.4885	0.0819	0.4870	-0.2259	0.4882	0.0205	0.0200	0.7430	2010	7.403.0	0.00	0000	0.4849	0 6400	0.4853	.05770	0.4840	0.8471	RT2	0.4812	-1 4339	0.4797	.17511	0.4870	0.754	0.4747	-2.8228
	1 1 1	1,697	0.49	1000	4000	0.00390	0.4900	0.4060	0.4900	0.3427	0.4808	0.0000	0000	4963	0.2821	0.4964	26.40	-0.2019	70240	0.4060	0.450	0.4057	7004.0	0.4057	0.4035	0.4052	0.5048	0.4949	-0.5658	BT1	0 4944	0.6675	0.4820	3 2573	2,52,5	1 2614	0.4782	4 0778
	SEO	10.864	75 0 1 0 864	ZD deila 70	24 45 to 90	Za della 76	7 1 0 861	Zr delta 70	1980 UZ	Zn delta %	2 1 0 861	2) nei(a 70	2) 401t 92	22 I 0.87	20 CHOP 02	25 1 0 8/1	2- 4-10-0/	Zp deita 70	70 40 17	Zr deita 70	21 1 0 861	Zt deita 76	30 1 0861	30 deila 70	24 40 100	30 UCIO 70	3f delta %	34 1 0 86	3h delta %	010	44	Ab delta %	70 000	70 00100	40 UEIIG 70	41 1 0 86v	4 UCILA 70	4f delta %

TRMM REVEN 31AS 10.86v

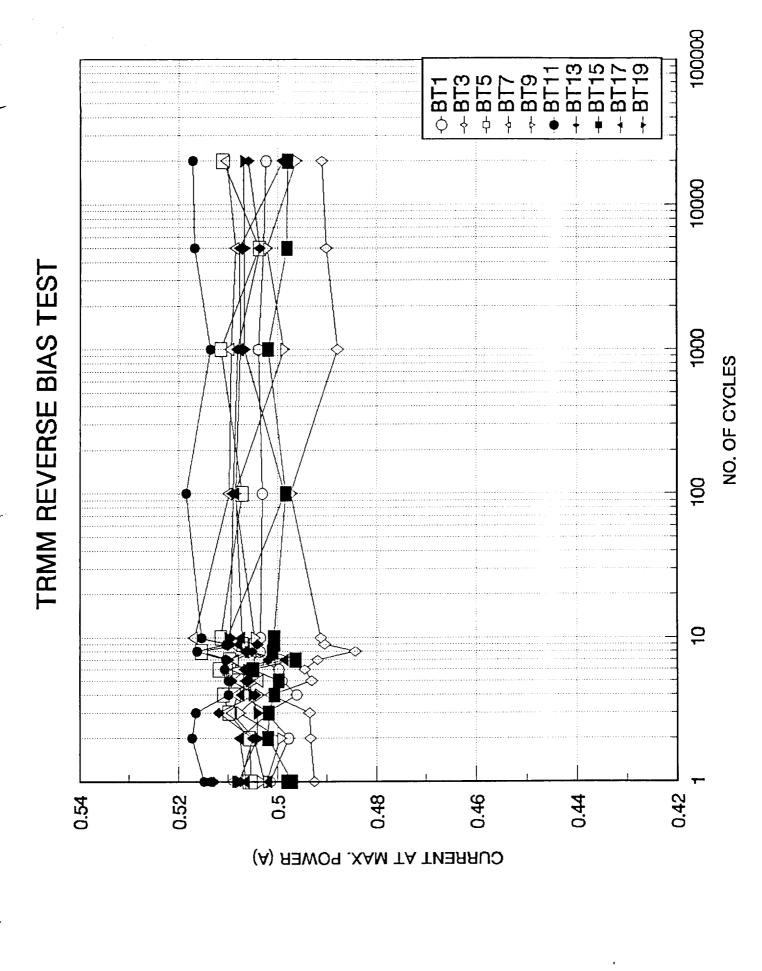
	PANEL Voc Isc
-	VERSE.
	RMM RE

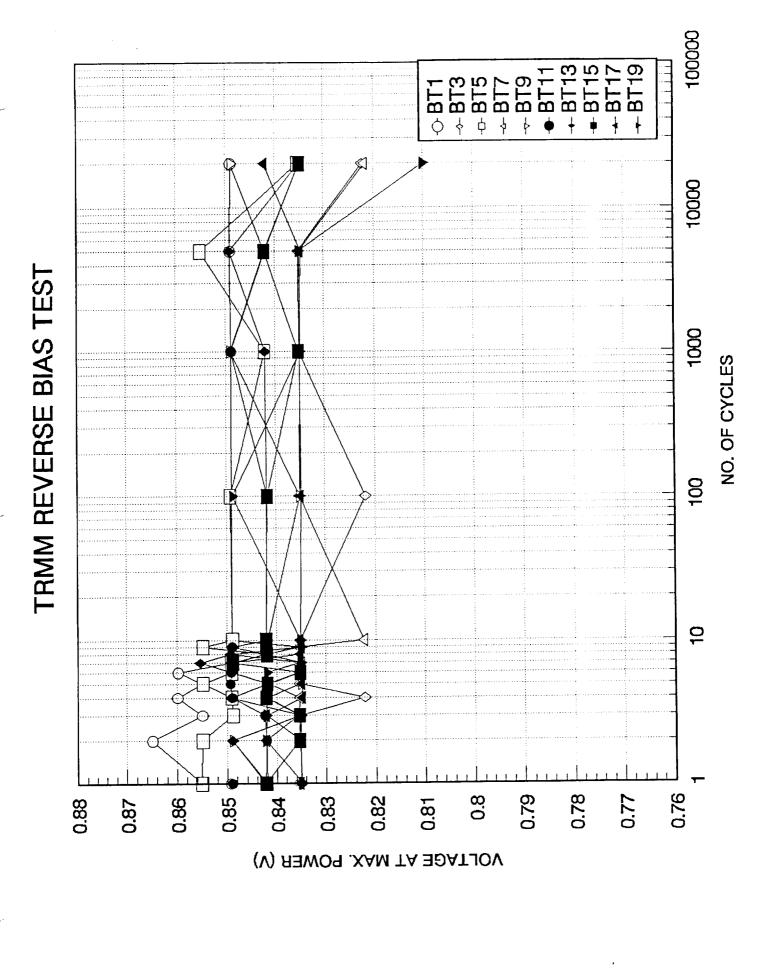
BT20	0.9998	0.5551	0.9927	0.5564
BT19	1.0014	0.5554	0.9872	0.5553
BT18	1.0022	0.5505	0.9955	0.5504
BT17	1.0168	0.5499	0.9983	0.5509
BT16	1.0066	0.5447	1.0008	0.5454
BT15	1.0094	0.5440	0.9934	0.5444
BT14	1.0118	0.5559	0.9811	0.5567
BT13	1.0168	0.5523	0.9940	0.5519
BT12	1.0031	0.5502	0.9871	0.5515
BT11	1.0170	0.5602	1.0006	0.5605
BT10	1.0135	0.5371	0.9939	0.5382
819	1.0034	0.5454	1.0008	0.5464
BT8	1.0097		1.0038	_
BT7	0.9988	_	_	- 1
816	1.0097 0.9899	0.5404	0.9913	0.5533
815	1.0097	0.5525	1.0063	0.5555
BT4	1.0093	0.5482	1.0012	0.5496
BT3	1.0043		0.9970	
BT2	1.0092	0.5431	1.0058	0.5440
BT1	1 0272	0.5465	1.0086	0.5463
SEQ	2b Voc	2b Isc	4d Voc	4d Isc

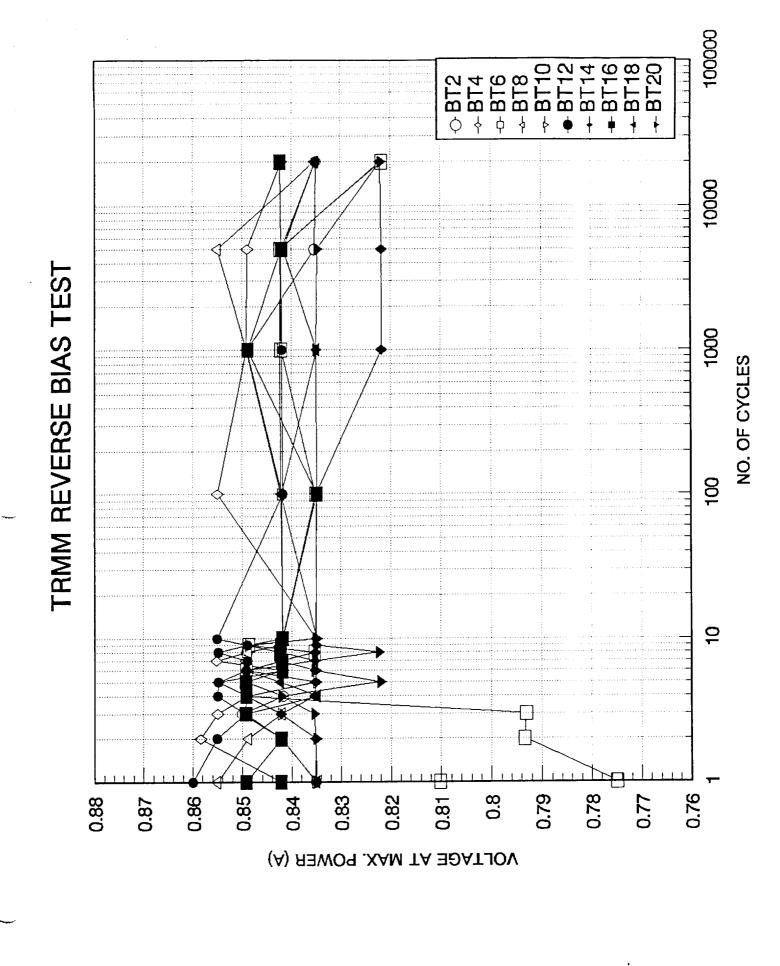
7 492 mm @ 870 mb 8 500 min @ 870 mb 9 508 min @ 870 mb

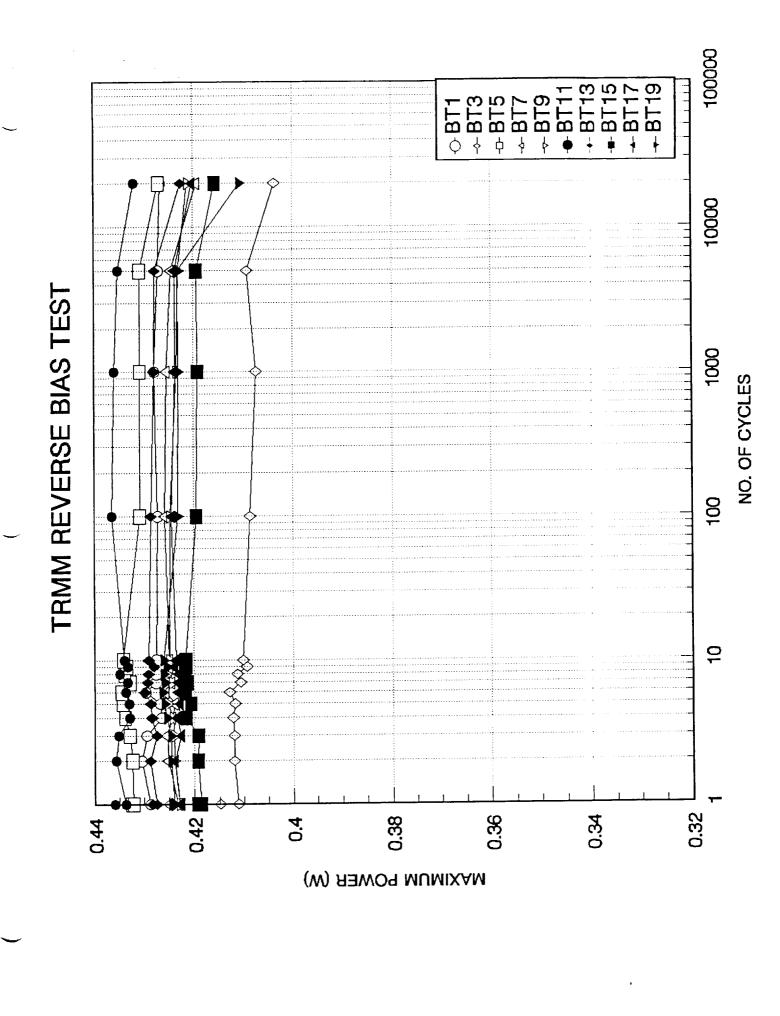
	I_{SC}	Voc	Vmp	Imp	Pmp	\mathcal{I}_{ν}	ΔV	FF	へ
_	,5481	1.0168	. 3 493	.5046	.4286	.4977	11	.769	18.0
2	.5455	1.0109	.8421	.5022	.4212	.4881	18	.764	17.7
3	.5464	1.0067	.8355	.4965	.4148	. 4789	25	.754	17.4
4	.54 95	1.0116	. 8472	.5087	.4284	.4973	18	.771	18.0
5	,5540	1.0116	. 8550	.5058	.4325	.5019	5	.772	18.2
6	.5492	.9912	.8102	. 4455	.3609	.4075	50	.663	15.2
7	.5557	1.0012	.8351	.5090	.4251	.4897	25	. 764	17.9
8	.5458	1.6123	. 8489	.4993	.4239	.4922	11	.767	17.8
9	.5470	1.0058	.8603	.4902	.4239	.4902	18	.77/	17.8
10	.5390	1.0044	. 8348	.4991	.4166	.485	25	.770	17.5
11	.5623	1.0070	. 8599	.5054	.4359	.5654	//	.770	18.3
12	5515	1.0053	.8493	,5120	.4348	,5052	" //	.784	18.3
13	.5529	1.0067	.8352	.5129	.4284	.4964	75	.770	18.0
14	,5568	1.0005	.8352	.5092	.4253	.4896	25	.763	17.9
15	.5452	1.0106	.8421	.4980	.4194	.4859	18	.761	17.6
16	.5470	1.0070	.8422	.5050	.4253	.4923	18	.773	17.9
	.5526	1.0036	.8421	,5018	.4226	.4880	18	.762	17.8
18	.5527	1.0020	. 8349	.£076	.4238	.4898	25	.765	17.8
.19	.5558	1.0009	.8349	.5085	.4245	.4887	25	.757	17.8
20	.5566	.9993	.8422	.5041	. 4246	.4881	18	.764	17.8
\overline{x}	.5508	1.0065	.8432	.5042	.4252	.4919	18.4	.767	17.87
\circ	.0054 (.98%)	.0046(.45%)	.0082(.9	77%) .0056 (1.	14).0053(4	24). 06 70 (1.4	2%)6.1	.0064	.23
01-1	.0055	•						.0066	.24
									
	#6			_				7/0	.774
R	.5506	1.0058	.8416	.5013	.4220	.4877	20.0	. 164	17.74
\sim	.0053	.0056	.0108	.0139	.0149	.0196	9./ 0.=	.0235	
07-1	,0054	.0058	.0111	.0143	.0153	.0201	7.3	.0241	.64

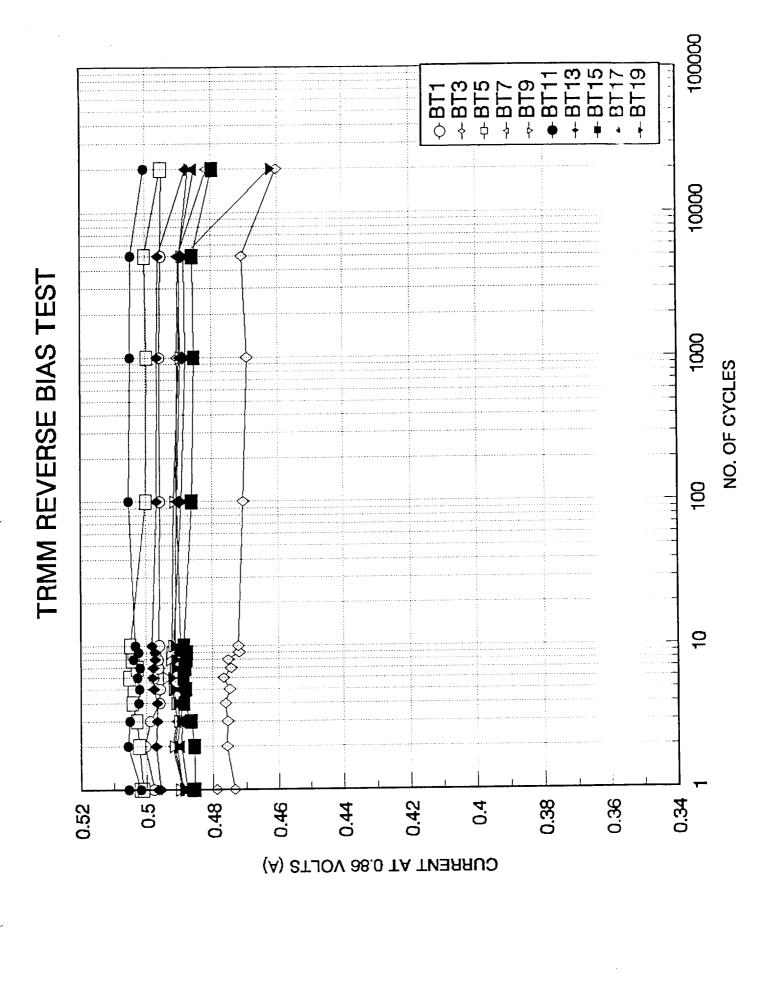
16.8 mV low based on Vmax - 860 mV 18.4 mV low based on DV











TRMM REVERSE BIAS TEST 1000 9 우 Ŋ ιŲ 5 PERCENT DELTA POWER (%)

 ♦ BT1

 ♦ BT3

 ♦ BT5

 • BT7

 • BT11

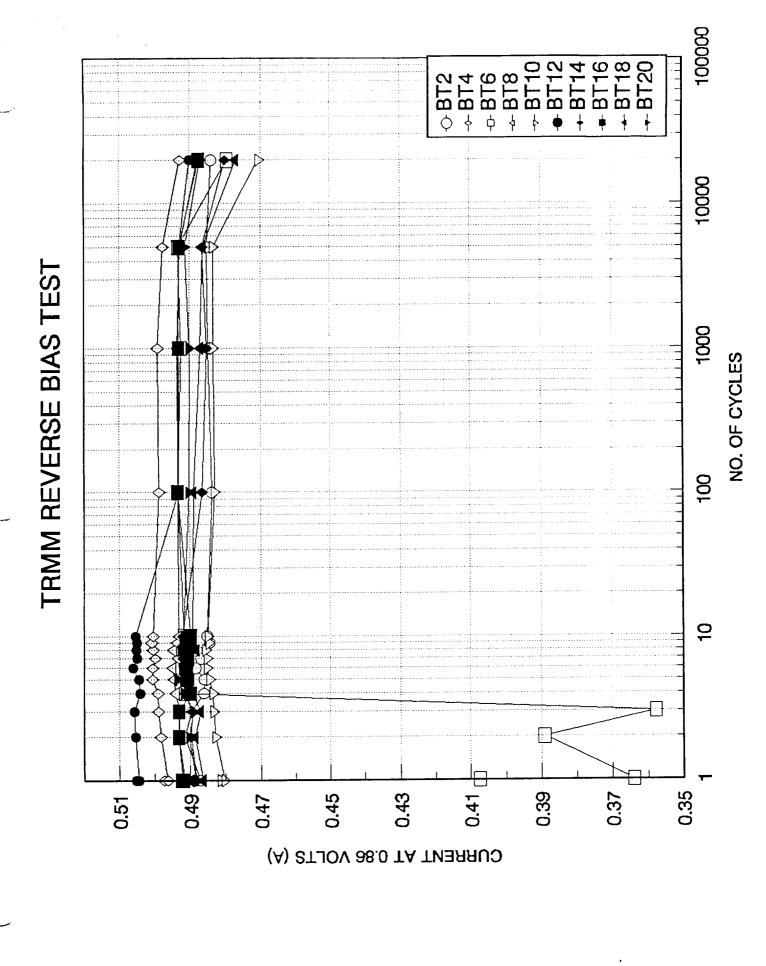
 • BT13

 • BT14

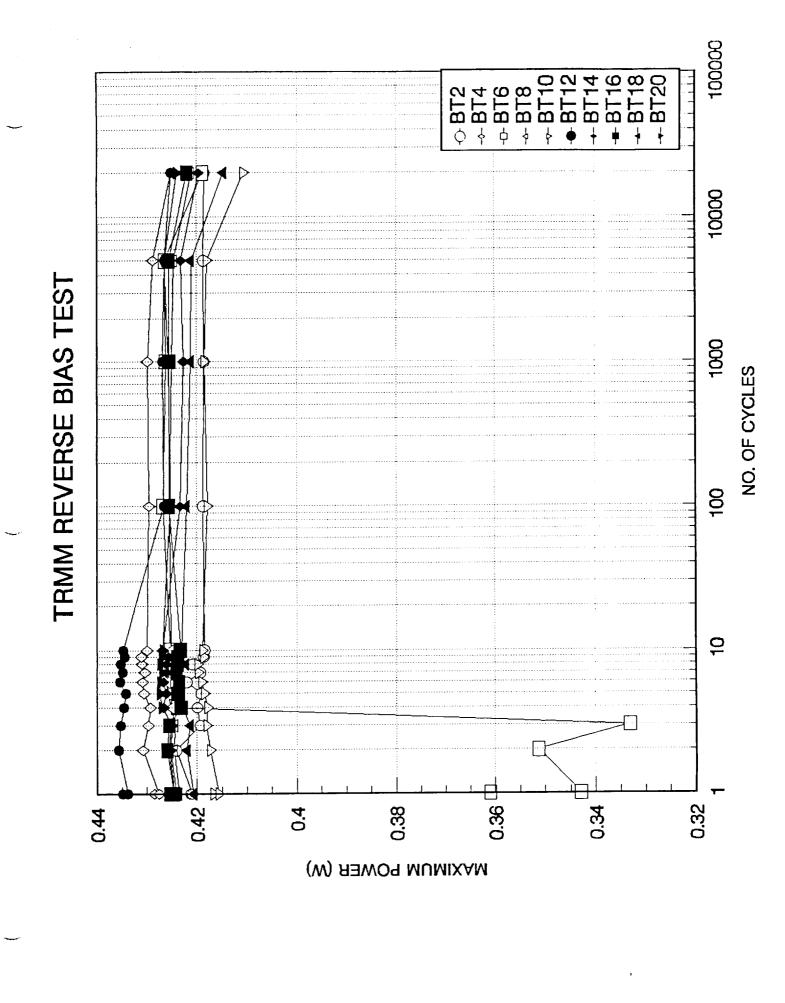
 • BT15

 • BT16

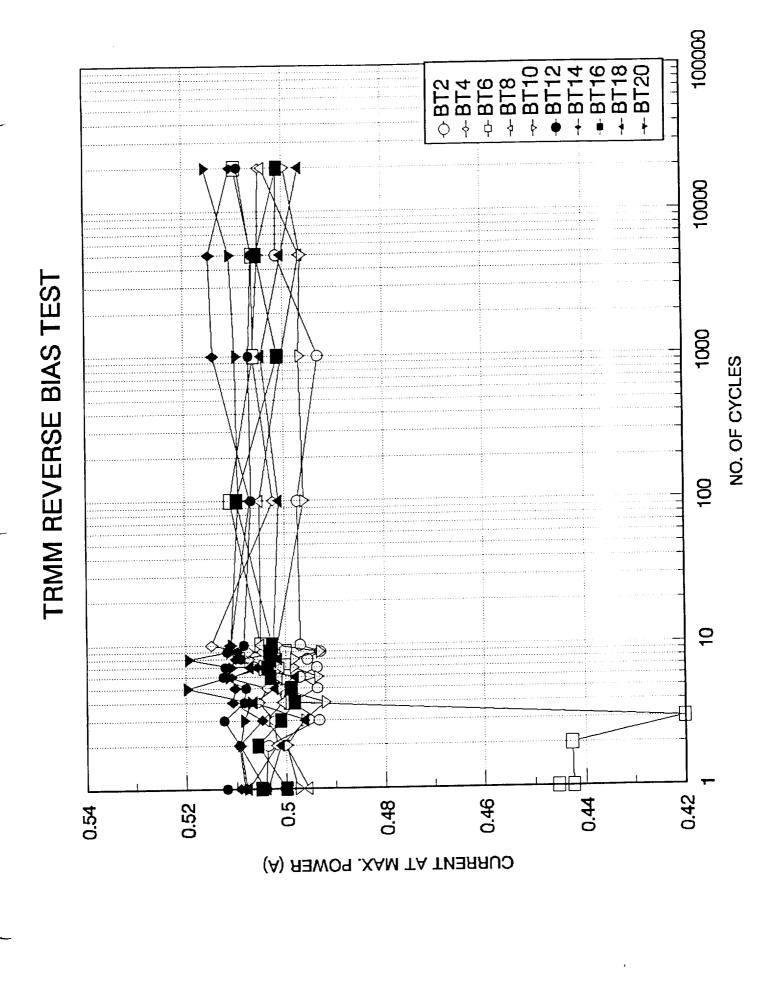
 TRMM REVERSE BIAS TEST NO. OF CYCLES 100 9 8 5 2 S PERCENT DELTA CURRENT AT 0.86 VOLTS (%)



TRMM REVERSE BIAS TEST 9 9 Ŋ 2 20 PERCENT DELTA CURRENT AT 0.86 VOLTS (%)



TRMM REVERSE BIAS TEST S 2 PERCENT DELTA POWER (%)





PANEL 828340-1 AND 828360-1 TRMM

NMR Summary
 Paretto Charts

Summary of cracked cells by process

Use as is and repair Disposition summary
 Paretto Charts

Interconnect Defects

Cell Stack Defects

May 8, 1996 Fernando Corella



828340-1 OUTBOARD S/A PANEL TRMM Panel Q.A. NMR Summary

Corrective Action	Inherent limitation, None Required	Inherent limitations, None Required	Inherent limitations, None Required	Employee counseled	Inherent limitations of the process: None Required	Inherent limitation, None Required		Inherent limitations of the lay-down process None Required	Employees counseled	Inherent limitations, None Required
Number of Line Items	17	4	-		-	-		σ	8	-
MODULE ASSEMBLY	<u>Defect Type</u> Cracked cells	Contamination in solder joint, fibers	Cracked coverglass	Wrong termination strip installed	Insufficient solder in solder joint	Contamination in solder joint, adhesive	PANEL ASSEMBLY	Cracked cells	Bonded module strings misoriented	Cracked coverglass

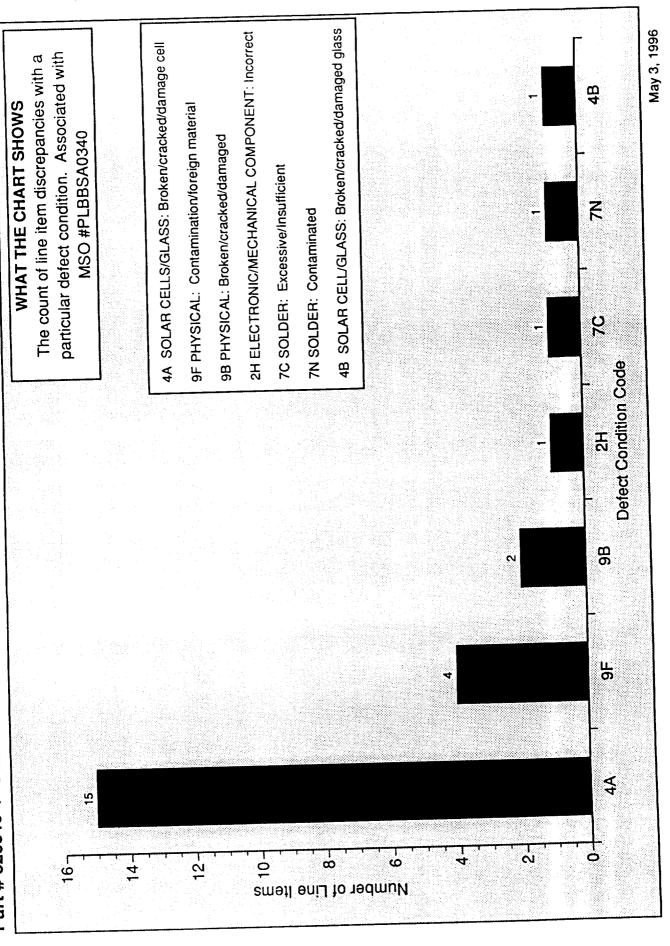


828340-1 OUTBROAD S/A PANEL TRMM Panel Q.A. NMR Summary

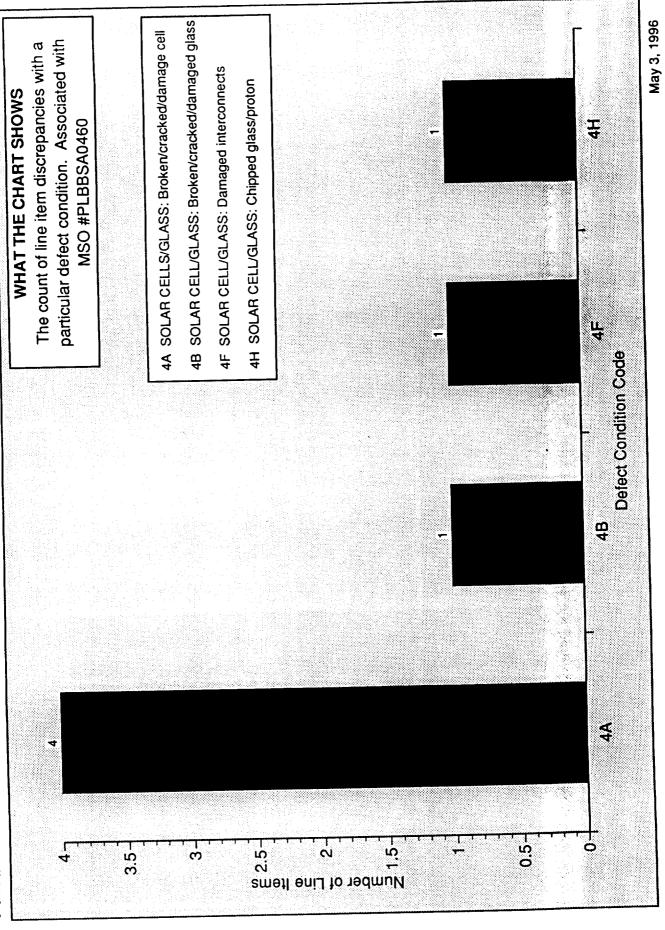
PANEL ASSEMBLY CONTINUED

None Required, data will be reported to GSFC who directed the procurement of this device	Inherent limitations, None Required cells of a higher MA value were not available Corrective Action	Inherent limitations of the process: manufacturing and environmental testing	Inherent limitations of the process: manufacturing and environmental testing	Employee counseled Inherent limitations, None Required
~	Number of Line Items	4	~	
Thermistor continuity failure	Cells used in rework of panel are of a lower MA of the cells being replaced POST ACOUSTIC Defect Type No defects	POST THERMAL VACUUM Cracked cells	Cracked coverglass	Damaged interconnect, damaged during a rework operation .Chipped coverglass

Pow Sources- Project TRMM (Module sembly) Part # 828340-1 Out Board S/A



Power, Sources- Project TRMM Part # 828340-1 Out Board S/A, Post Thermal Vacuum





828360-1 +Y INBROAD S/A PANEL TRMM Panel Q.A. NMR Summary

<u>Corrective Action</u> Inherent limitation, None Required	Under Investigation	Supplier Action	
Number of <u>Line Items</u> 16	2	Ψ-	
MODULE ASSEMBLY Defect Type	Clacked cens Riemish on cell	or strip	

PANEL ASSEMBLY

Cracked cells	2	Inherent Limitation, None Require
	-	Employee Counseled
Chipped Coverglass		Palasting Conclused
Incorrect Wiring	•	
Thermistor continuity failure	7-	None required GSFC directed procurement of device

POST ACOUSTIC

No Defects



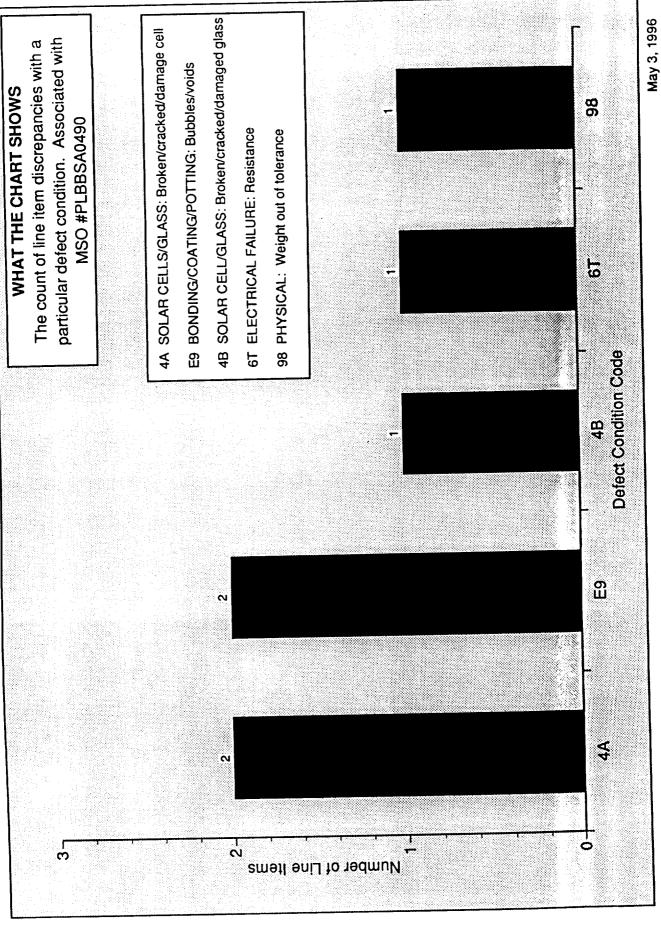
828360-1 +Y INBROAD S/A PANEL TRMM Panel Q.A. NMR Summary

Corrective Action Recommend customer specification change	Recommend customer specification change	Inherent limitations of the process: manufacturing and environmental testing	Under Investigation	Employee counseled
Number of Line Items	-	2	. —	~
Post Thermal Vacuum Defect Type Panel exceeds limits is 18.56 lbs s/b <= 18.07 lbs	Thermistor continuity failure exceeds limits	Cracked cells	Bubbles formed on panel from	Damaged glass

Sources- Project TRMM (Panel At ambly)

May 3, 1996

المامن 'Sources- Project TRMM (Panel + المامن Sources- Project TRMM (Panel + Indicated))

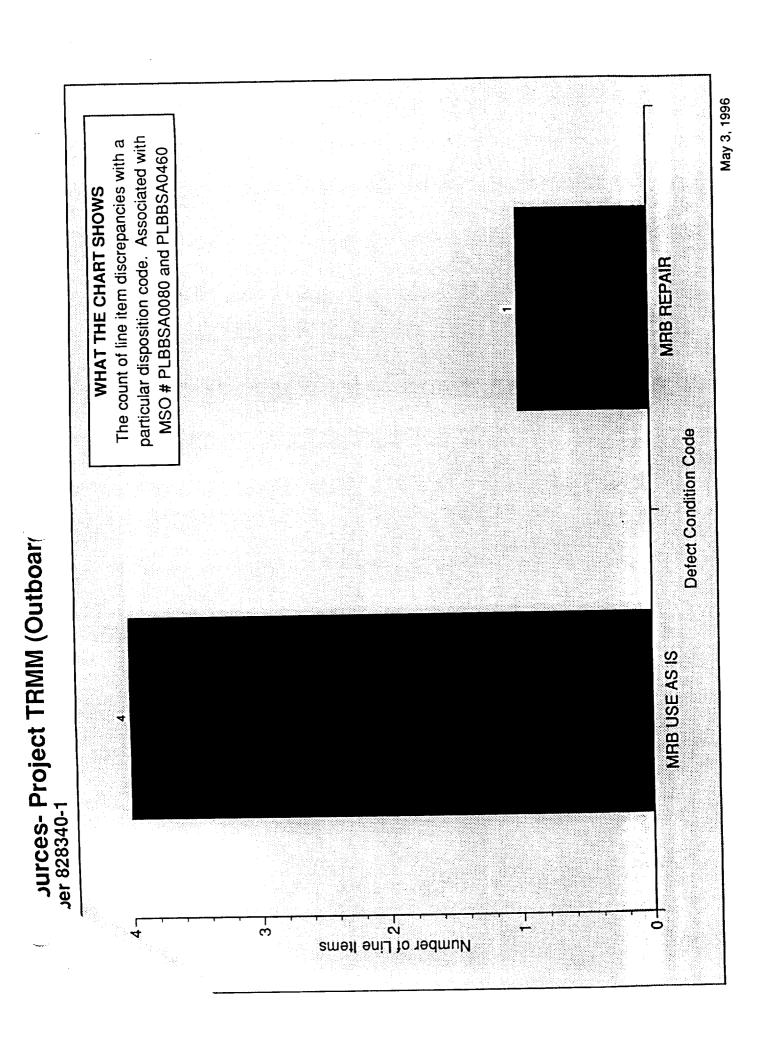






Summary Cracked cells at Panel Level

	PANEL NUMBER	PANEL NUMBER
PROCESS	828340-1	828360-1
POST LAY-UP	44	12
POST ACOUSTIC	0	0
POST THERMAL VACUUM	56	24
TOTAL	100	35

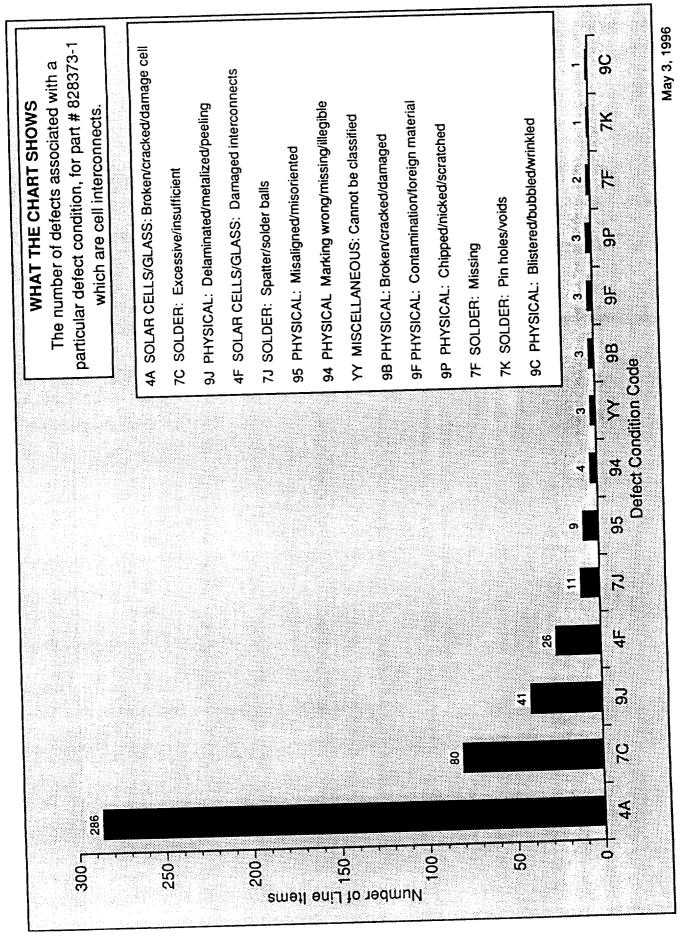


Defect Conditions associated with MRB Repair and Use As Is dispositions for MSO numbers PLBBSA0080 AND PLBBSA0460.

DR#	=	DISPOSITION	MSO	DEFECT COND
RR4430	-	MRB REPAIR	PLBBSA0080	PHYSICAL: Misaligned/misoriented
RR4533	ဧ	MRB USE AS IS	PLBBSA0080	SOLAR CELLS/GLASS: Broken/cracked/damaged cell
RR4533	7	MRB USE AS IS	PLBBSA0080	MISCELLANEOUS: Cannot be determined
RR4897	=	MRB USE AS IS	PLBBSA0460	SOLAR CELLS/GLASS: Broken/cracked/damaged cell
RR4750	-	MRB USE AS IS	PLBBSA0080	PROCESS: In-process testing

Defect Conditions associated with MRB Repair and Use As Is dispositions for MSO numbers PLBBSA0100 AND PLBBSA0490.

DR#	=	DISPOSITION	MSO	DEFECT CONDITION
RR4620	2	MRB REPAIR	PLBBSA0100	WIRE/CONDUCTOR/CABLE/HARNESS: Missing
RR4895	3	MRB REPAIR	PLBBSA0490	BONDING/COATING/POTTING: Bubbles/voids
RR4737	3	MRB REPAIR	PLBBSA0100	SOLAR CELLS/GLASS: Chipped glass/proton
RR4732	-	MRB USE AS IS	PLBBSA0100	MISCELLANEOUS: Cannot be classified
RR4817	-	MRB USE AS IS	PLBBSA0490	PHYSICAL:Weight out of tolerance
RR4817	2	MRB USE AS IS	PLBBSA0490	ELECTRICAL FAILURE: Resistance



Pow

May 3, 1996



TRMM PANEL 828340-2 AND 828350-1

NMR Summary
 Paretto Charts

Summary of cracked cells by process

Use as is and repair Disposition summary
 Paretto Charts

June 27, 1996 Fernando Corella



828340-2 - Y OUTBOARD S/A PANEL TRMM Panel Q.A. NMR Summary

Corrective Action Inherent limitation, None Required	Inherent limitation, None Required	Inherent limitations, None Required	Supplier Action	Inherent Limitation, None Required Inherent Limitation, None Required None required GSFC directed procurement of device Employee counseled
Number of Line Items 40	1	-	2	-
MODULE ASSEMBLY Defect Type Cracked cells	Cracked coverglass	Chipped coverglass	P- collector strip delamination	Cracked Cells Cracked Colls Cracked Coverglass Thermistor resistance did not fall within tolerance band . (RT1,RT2) Wire Sleeving Damaged

POST ACOUSTIC

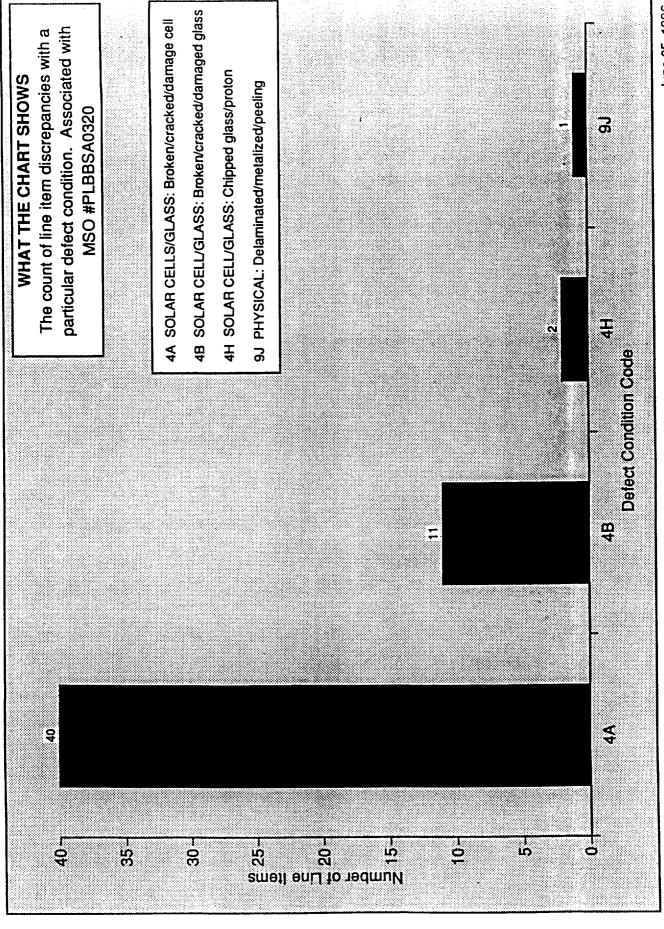
No Defects



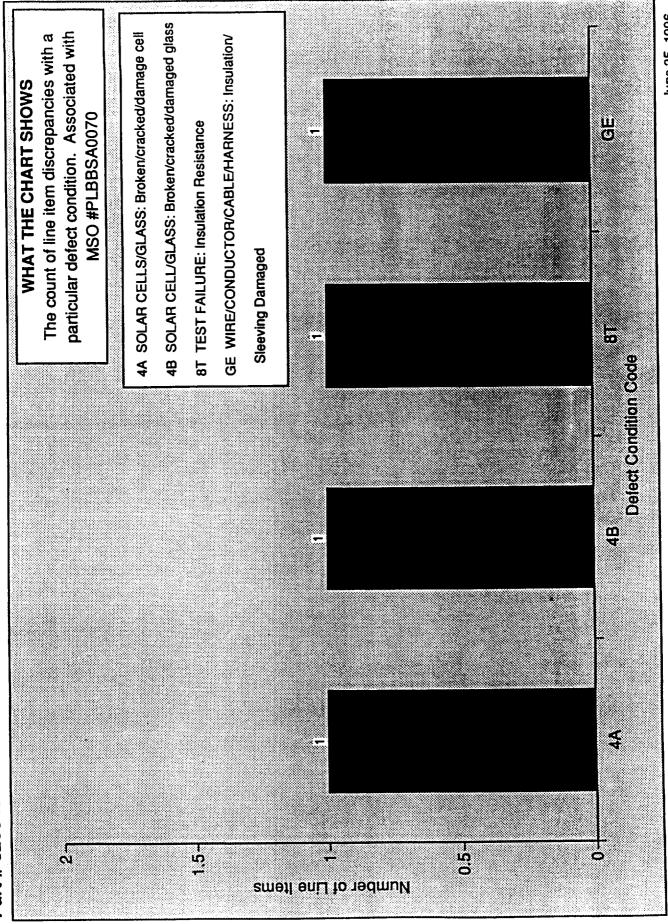
828340-2 -Y OUTBOARD S/A PANEL TRMM Panel Q.A. NMR Summary

Corrective Action	Inherent limitations of the process: manufacturing and environmental testing	Employee counseled	Under Investigation	Inherent limitations of the process: Manufacturing any environmental testing
Number of <u>Line Items</u>	23	•	-	-
Post Thermal Vacuum Defect Type	Cracked Cells	Damaged Glass	Bubbles Formed on Panel From Thermal Test	Delaminated Coverglass

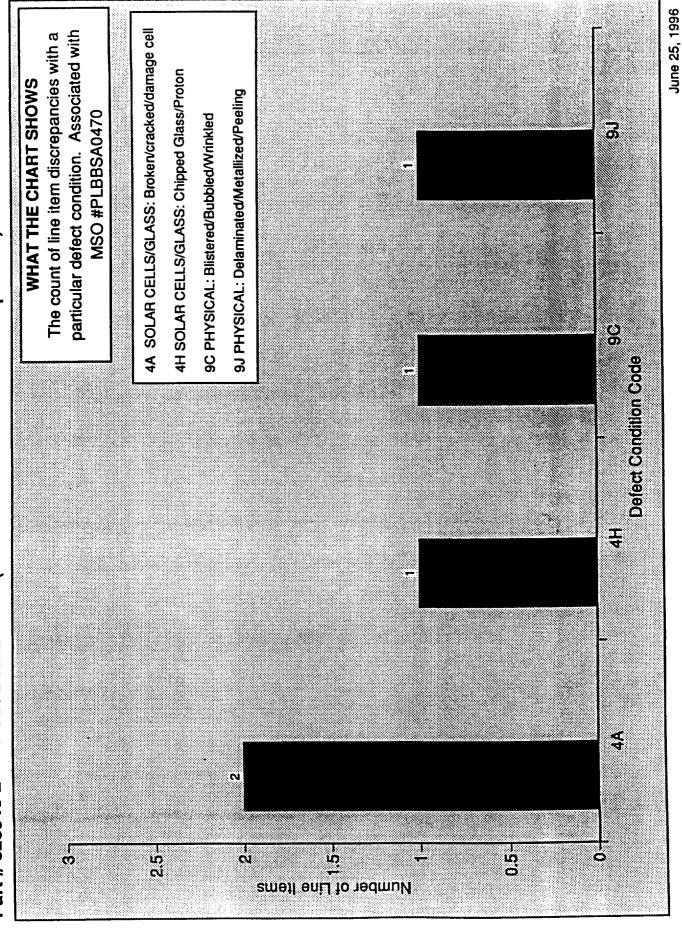
Jer Sources- Project TRMM (Modu Assembly) Part # 828340-2 -Y Outboard Panel



Pow Sources- Project TRMM (Panel & embly)
Part # 828340-2 -Y Out Board Panel



Sources- Project TRMM (28340-2 -Y Out Board Panel (Post Environmental / Final Inspection) Part # 828340-2 Pow





828350-1 -Y INBOARD S/A PANEL TRMM Panel Q.A. NMR Summary

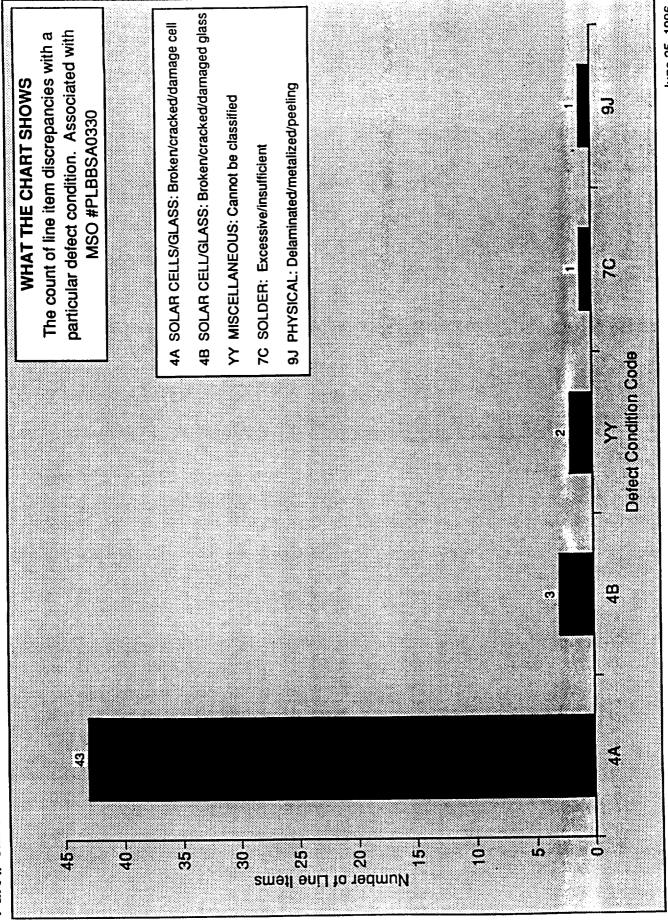
Corrective Action	Inherent limitation, none required	Inherent limitations, none required	Inherent limitations, none required	Inherent limitations, none required	Supplier action		Inherent limitations of the lay-down process none required	Inherent limitations, none required	None required, data will be reported to GSFC who directed the procurement of this device	Under investigation
Number of Line Items	40	ဧ	2	-	-		7	87	←	-
MODULE ASSEMBLY	<u>Defect Type</u> Cracked Cells	Cracked Coverglass	Cell Grading Required	Insufficient Solder in Solder Joint	Delaminated P-Collection Strip	PANEL ASSEMBLY	Cracked Cells	Cracked Coverglass/Chipped Coverglass	Thermistor Resistance Failure, Not Within Tolerance Band (RT1, RT2)	Shorted Wire on BT1 and BT68

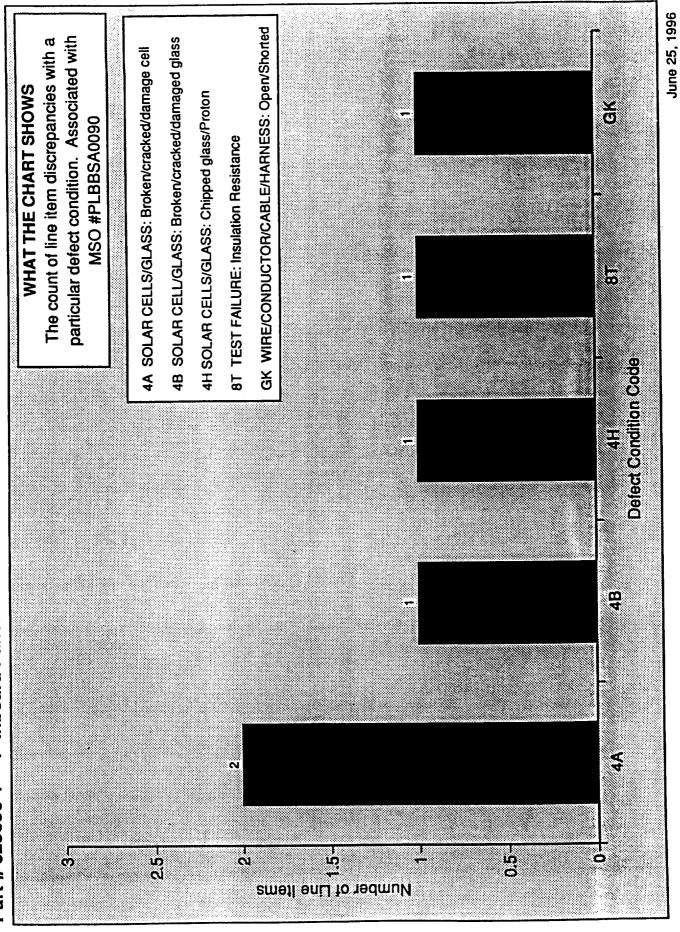


828350-1 -Y INBOARD S/A PANEL TRMM Panel Q.A. NMR Summary

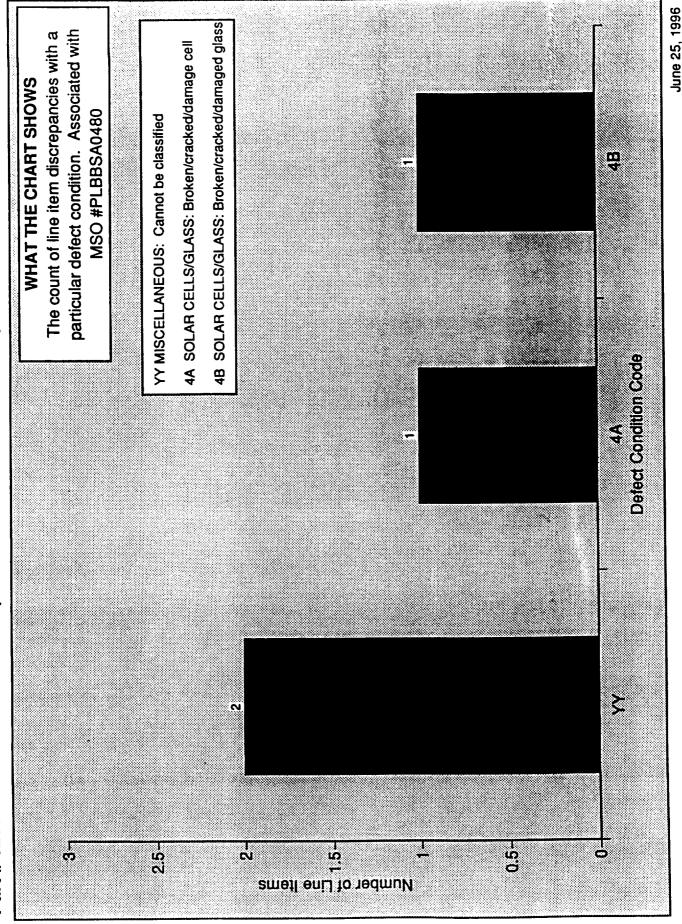
Corrective Action		Under investigation	Inherent limitations of the process: manufacturing and environmental testing	Inherent limitations of the process: manufacturing and environmental testing	Employee counseled	Inherent limitations, None Required
Number of Line Items		-	4		.	+-
POST ACOUSTIC Defect Type No defects	POST THERMAL VACUUM	Bubbles Formed on Panel After Thermal Test	Cracked Cells	Cracked Coverglass	Damaged interconnect, damaged	during a rework operation Chipped coverglass

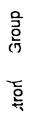
Pov. r Sources- Project TRMM (Module ssembly)
Part # 828350-1 -Y Inboard Panel





Pov. / Sources- Project TRMM Part # 828350-1 -Y In Board Panel (Post Environmental / Final Inspection)



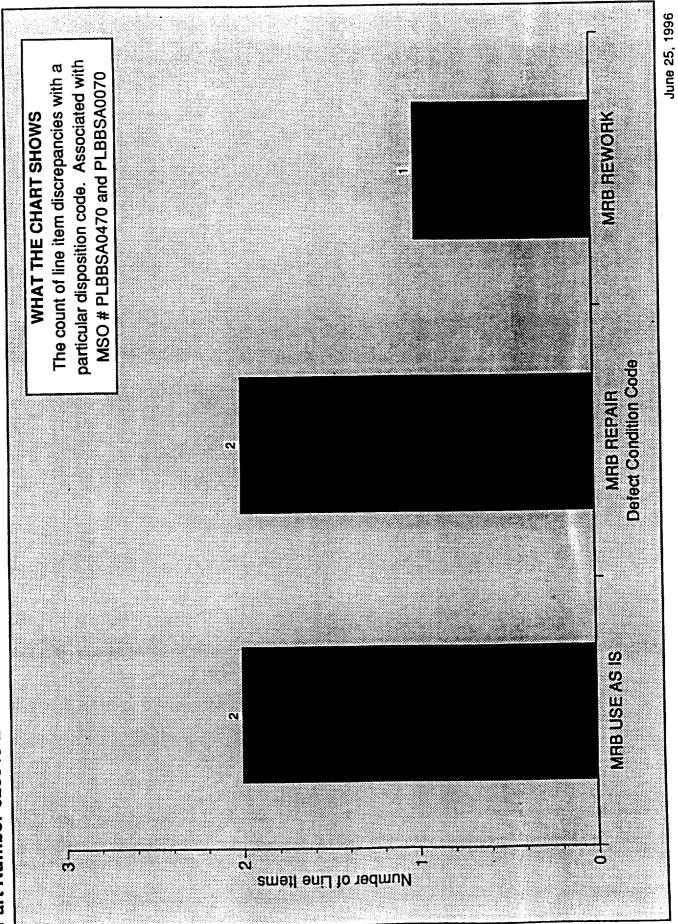




	Level
nary	at Panel
Summary	cells
	Cracked

	PANEL NUMBER *	PANEL NUMBER *
PROCESS	828340-1	828360-1
POST LAY-UP	44	12
POST ACOUSTIC	0	0
POST THERMAL VACUUM	56	24
TOTAL * For reference only	100	3 5
	PANEL NUMBER	PANEL NUMBER
PROCESS	828340-2	828350-1
POST LAY-UP	ນ	18
POST ACOUSTIC	0	0
POST THERMAL VACUUM	14	20
TOTAL	19	38

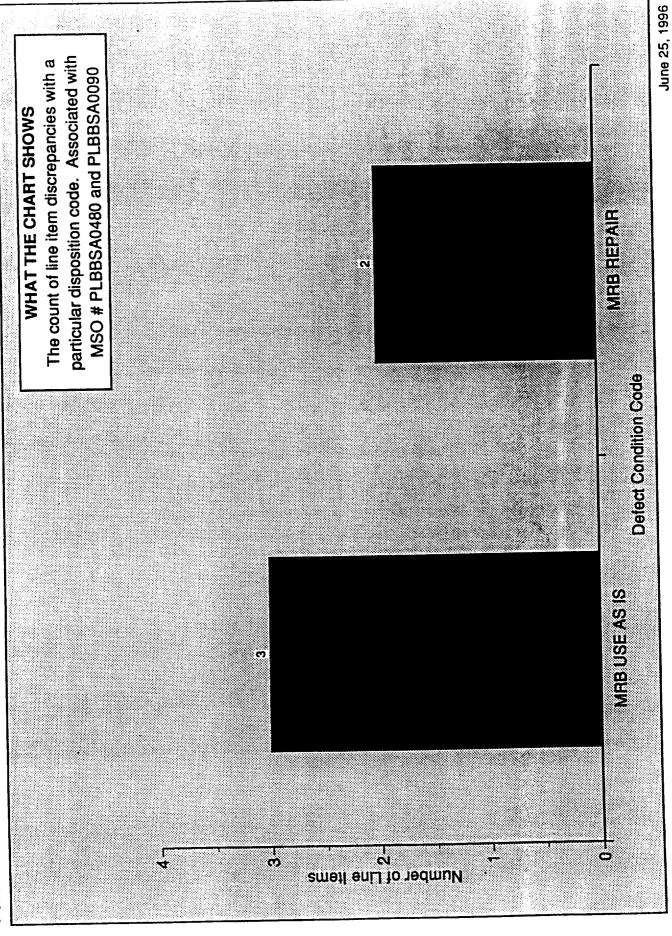
Pow(Sources- Project TRMM (-Y Outbox d Panel)



Pow Sources- Project TRMM (-Y Outb(rd Panel)

dispositions for MSO numbers PLBBSA0470 AND PLBBSA0070. Defect Conditions associated with MRB Repair and Use As Is

	5	DISPOSITION	MSO	DEFECT CONDITION
RR5572	-	MRB USE AS IS	PLBBSA0070	TEST FAILURE: Insulation Resistance
RR5678	3	MRB USE AS IS	PLBBSA0470	PHYSICAL: Blistered/Bubbled/Wrinkled
RR5380	-	MRB REPAIR	PLBBSA0070	WIRE/CONDUCTOR/CABLE/HARNESS: Insulation/Sleeving
HR5678	4	MAB REPAIR	PLBBSA0470	SOLAR CELLS/GLASS: Chipped Glass/Proton
	2	MRB REWORK	PLBBSA0470	PHYSICAL: Delaminated/Metalized/Peeling



Pow Sources- Project TRMM (-Y Inboa Panel)

Defect Conditions associated with MRB Repair and Use As Is dispositions for MSO numbers PLBBSA0480 AND PLBBSA0090.

	DISPOSITI	NO NO	W SO	DEFECT CONDITION
1 1	MRB USE AS IS		PLBBSA0090	TEST FAILURE: Insulation Resistance
RR5679 3	MRB USE AS IS		PLBBSA0480	MISCELLANEOUS: Cannot Be Classified
RR5679 7	MRB USE AS IS		PLBBSA0480	TEST FAILURE: High/Low Output Power
RR5272 1	MRB REP/	N.N.	PLBBSA0090	WIRE/CONDUCTOR/CABLE/HARNESS: Open/Shorted
RR5679 5	MRB REP	AIA.	PLBBSA0480	MISCELLANEOUS: Cannot Be Classified

REPORT DOCUMENTATION PAGE

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